

Roland

USERS GROUP

New

Music

Software



V3 1/2

C o m p o s e r

philip GLASS

*In New York
Studios:
MIDI
Makes It
Happen!*



The Magazine For The Electronic Musician. \$1

MIDI.



TO THE MAX.

Now, you just need one keyboard to take command of a whole synthesizer fleet.

Powered by MIDI, the Roland MKB-1000 MIDI Keyboard can drive upwards of 16 different external instruments. Place all of your favorite MIDI synthesizers under remote control, or build a Total MIDI System out of Roland's MKB sound modules.

Imagine having the legendary features of Roland's Jupiter synthesizers in a 19" rack mount unit. That's just what you get with the 8-voice polyphonic MKS-80 Super Jupiter, the MPG-80 Super Jupiter Programmer, and the 6-voice, polyphonic MKS-30 Planet S. The MKS-10 Planet P brings together 8 traditional keyboard sounds—including piano, electric piano, harpsichord, and clavinet—in one rack mount unit.

Assemble a custom system to suit your own needs. The MIDI Keyboard lets you organize, layer, and combine a teeming multitude of sounds for a true command performance. With an assignable Split Point, plus Poly, Mono, Dual, and Whole Modes, the MIDI Keyboard lends itself to any playing situation. 128 Patch Memory programs store all the essential sound parameters and send them out to the satellite instruments via MIDI.

Thanks to the MKB-1000, you're no longer forced to get used to a whole new keyboard each time you buy a new synthesizer. Upgrade without compromising your technique. The MKB-1000 MIDI Keyboard is all the keyboard you'll ever need. Finally, synthesists can develop the sort of close, lasting relationship with their instrument that other players have always enjoyed.

With 88 wooden keys and full touch sensitivity, the MIDI Keyboard is as expressive and carefully crafted as a fine acoustic piano. (The 76-key MKB-300 is a velocity-sensitive synthesizer keyboard offering the same control features as the MKB-1000 at a modest price.)

On stage, you'll set up easy and no longer be hidden behind a pile of "techno-rubble." After all, your synthesizers should be heard; *you* should be seen, right?

One musician; one keyboard. Sometimes the most advanced ideas are the simplest ones.

For more information, contact RolandCorp US: 7200 Dominion Circle, Los Angeles, CA 90040. 



Roland Makes It Happen!

PUSHING THROUGH THE TREACHEROUS THICKET, HIS TRUSTY DSD-2 BY HIS SIDE, PROFESSOR D. SAMPLER BOLDLY LEADS THE ...

SAMPLER SAFARI!



From the outermost reaches of modern technology, BOSS has brought forth a digital sampler and delay—all in one compact footpedal.

The DSD-2 lets you sample a seething jungle of sounds. Bring any sampled sound back to civilization. Unleash it with just the touch of a footpedal and a trigger input from your instrument. With sampling times of 200 to 800 mSec, you can take everything from distant drums to a wildcat scream and make it part of your sonic menagerie.

Switch into the Delay mode and you're ready to stalk the big game effects. The DSD-2 gives you clean, accurate delay, continuously variable between 50 and 800 mSec. And when it comes to audio quality, the DSD-2 outruns any analog beast in the bush.

Join the Sampler Safari. Go offer sounds in their natural habitat. Bring 'em back alive with the DSD-2! For a full color 18" x 24" Sampler Safari poster send \$5.00 to BOSS Sampler Safari c/o Roland Corp US, 7200 Dominion Circle, Los Angeles, CA 90040.



 **BOSS**

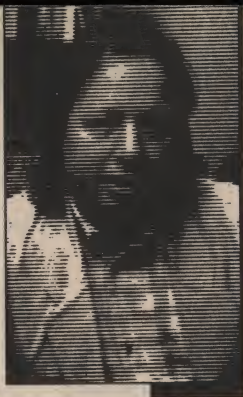


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Philip Glass Plus

Interview by Jeffrey Rona

The internationally pre-eminent American composer discusses his unique creative style, while his producer Kurt Munkacsi and keyboardist Michael Riesman reflect on MIDI and the future of music composition.



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Three On Three: MIDI, the Computer, and You

by Lenny Kaye

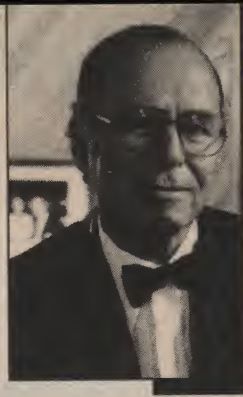
From the hottest all-MIDI recording studio to a modest loft-based demo facility, New York producers and musicians are using the newest in music technology to turn creative dreams into rewarding realities.



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Roland Centerstage/ The GR System: One Step Beyond

by Peter Mengozzi

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Corrections to Volume 3, Number 1, Page 6, far left column, second sentence. Only the time delay settings on the SD-1000 Digital Delay can be memorized, not all the front panel settings as stated. Page 16, middle column. Reference made to a stop load option in the MUSE program is not correct. In its initial release MUSE will not contain a stop load option. The statement on page 44 that the SRV-2000 Digital Recorder has a twenty-four patch program memory is no longer correct. The release version will have a thirty-two patch program memory. Inside back cover, SDX-80 ad, line 7, "24 f.p.s." should be deleted; line 8, "programmable time bases" should read "user adjustable time bases"; line 10, "... the Sync Box gives sequencers newfound abilities ..." should read "... the Sync Box gives sequencers with MIDI song pointer newfound abilities."



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rial Assistant, Donna Taylor. Left cover photo by Ziya Danishmend. ■ Send all correspondence to Roland Users Group magazine, 7200 Dominion Circle, Los Angeles, CA 90040. We are not responsible for unsolicited material, which must be accompanied by return postage. All mail directed to the "Letters" column will be treated as unconditionally assigned for publication and subject to RolandCorp's unrestricted right to edit and comment. RolandCorp assumes no liability for errors in articles or advertisements, and opinions expressed by authors are not necessarily those of RolandCorp US.

Kudos for Seminar Program

I'm writing to say how fab and edifying the Roland Electronic Music Seminar was that I attended. The MIDI sessions were very helpful, and everything was presented objectively rather than as a launchpad for sales.

Especially enjoyable were *MUSE* program author Jeff Rona and guest speaker Michael Boddicker, who was most charitable to share so much of his valuable experience and information with us. He seems to be one superstar session player who doesn't have a Stonehenge-sized ego.

Larry McClain,
Los Angeles, CA

Method to His Madness

I'm writing to find out just what it is about Roland synthesizers that could make a guy go nuts?

My husband was a pretty hot guitar player, then he had the opportunity to play a friend's synthesizer and decided he had to have one. After about a year of playing on that friend's keyboard, the idiot went out and traded a Charvel Jackson guitar (Randy Roads-type) and a Marshall double stack for a Juno-106 from Roland. I knew then that he was out of his mind.

He practiced playing that Juno till he was good enough to join a band. Then, a few weeks ago, on his way home from a gig, when he stopped to get a bite to eat, his truck was stolen containing his pride and joy, that synthesizer. He has since quit the band and taken a straight job. He says he won't play until he can afford a new Roland synthesizer. Though he has saved enough money to purchase any number of other brands for sale used, when I mention it he gets down right psychotic.

I don't understand, what makes Roland so much better?

Michelle Willis,
Spring, TX

Another user provides the answer:

I operate an eight-track production studio and I needed a synthesizer that

could produce a good variety of sounds. I purchased the Juno-106 on word-of-mouth advice and my expectations have been overwhelmed. The Juno-106 has more punch, more power, and more clarity—both live and in the studio—than any other synth I've heard, regardless of the price. It will replace three much higher priced units I am now using. The Juno-106 will truly be my "mother of invention."

Steven Page Calfee,
Southern Star Recording,
Hempstead, NY

Great Expectations

Thank you for manufacturing the JX-8P polyphonic MIDI synthesizer! It's the first full-size synthesizer I have ever owned and I'm finding it gives me unlimited expression. For recording or live performance, the JX-8P is more than I could expect from any one instrument.

Robert O'Brien,
Brooklyn, NY

Electrical Connections

The Service article in the last issue entitled "Musician's Tool Kit: AC Grounding and Noise," was wonderful. That's just what we working musicians need: Good advice on problems we face every day. Can you recommend any other articles or books that can provide useful information like this for working musicians?

Doug Nielsen,
Mabelvale, AR

On the subject of electricity we recommend the book Practical Electricity by Robert G. Middleton, published by Howard Sams. Other useful books available at Radio Shack stores are their Electronics Study Courses, for AC and DC circuits, and the Guide to VOMs and VTVMs.

An excellent article on grounding appeared in Recording Engineer/Pro-

ducer magazine, February 1980 issue, entitled "Practical Solutions to Concert Sound Grounding Problems" by Ed Simeone and Robert Carr. Reprints available by contacting the magazine at PO Box 2449, Hollywood, CA 90078.

A sixteen-page applications note, Techniques for Hum and Noise Reduction in Sound Reinforcement Systems, may be acquired by writing Linear and Digital Systems Inc., 46 Marco Lane, Centerville, OH 45459.

Also, the Federal Communications Commission publishes a useful thirty-one page booklet entitled How to Identify and Resolve Radio/TV Interference Problems. Write to FCC, File 1410-C. 1919 M Street NW, Washington DC 20554

Letters, We Get Letters

I am a GR System user, having a G-100, G-300, as well as a TR-707 Rhythm Composer and assorted BOSS effects. I appreciate Roland's receptivity and commitment to developing technology to its fullest potential for the creative arts. I'd also like to thank you for providing the Roland Users Group magazine. It provides a valuable service to us users, service being a point on which the music business often falls short. Roland's continuing support in the form of alternate programs for synthesizers offered at reasonable prices, the JX-3P PROM modification update, and other product updates are the kinds of things a working musician appreciates. I hope we represent a big enough segment of your business to insure this continuing support.

William Miho,
New York, NY

Roland remains committed to user support whether you are a professional musician, semi-professional, or amateur hobbyist. The Roland Users Group magazine was created for all users and we encourage your feedback in the form of letters. Let us know what you think.

Address all correspondence to Roland Users Group Magazine, 7200 Dominion Circle, Los Angeles, CA 90040.

All the noise that's fit to print on who's who and what's what throughout the world of Roland users.

by **Cristy Robertson**, Roland Inside Sales

No fancy lingo this issue because by the time you read this, I will have gone and got myself hitched, and probably be off in some tropical Hawaiian paradise on my honeymoon. Aloha oi Roland users! Besides me tyin' the knot, you may ask "What's New, Pussycat?" Well, here goes:

"It's Not Unusual" to see a JC-120 guitar amplifier in the band behind **Tom Jones**. You see, the JC-120 has that pure sound that allows Tom's powerful pipes to come through loud and clear. In all honesty, **Dan Wexler**, guitarist in the band **Icon**, says that he uses his JC-120 for "all the clean stuff" on their *Night of the Crime*. Of course, Dan also puts his GR-700 polyphonic guitar synthesizer, and BOSS DS-1 Super OverDrive and TU-12 Chromatic Tuner to good use. You'll even find JC-120s working hard on "Holiday" with **Rudy Shenker** and **Matthias Jabs** of the **Scorpions**. And any gathering of **General Public** is *All the Rage* when **Dave Wakeling** uses his BOSS DD-2 Digital Delay pedal with his JC-120 and **Mickey Billingham** plays the JX-3P programmable, preset polyphonic synthesizer. (I'd like to hear you try saying those last four words three times fast!)

My wedding plans have really kept me **Rush**-ing around the last few weeks and I am totally *Grace Under Pressure*. However, knowing that **Geddy Lee** uses a Roland JX-8P six-voice polyphonic MIDI synthesizer makes me feel like a new-world woman. I've come to the conclusion that it takes a *Supergirl* to plan a super wedding that won't be a *Runaway*, and I think it would take a *Legend*-ary combo like composer **Jerry Goldsmith** and his MKB-1000 MIDI Keyboard Controller, MSQ-700 Multitrack Digital Keyboard Recorder, and JX-8P to pull me out of this *Twilight Zone*.

Originally I wanted to have **Judas Priest** officiate at the wedding, but they've been too busy creating new sounds on their two GR-700 guitar synthesizers. I guess that's okay. Things may have gotten a little wild—which reminds me: One of the original guys who was "Born To Be Wild" is howlin' **John Kay**, formerly of **Steppenwolf**. He's on a coast-to-coast tour this summer and his list of Roland and BOSS gear reads like one of our catalogs. He's

got a JP-8 eight-voice synthesizer, an MSQ-700 Digital Keyboard Recorder, a TR-909 Rhythm Composer, the SVC-350 Vocoder, a GR-700/G-707 guitar synthesizer unit, as well as the BOSS GE-7 Graphic Equalizer, OC-2 Octave pedal, CE-2 and CE-3 Chorus pedals, DM-3 Delay pedal, SD-1 Super OverDrive, BCB-6 carrying box...shall I go on? Plus, he's always calling me at Roland to ask when new products will be available.

Yup, "It's a Fine, Fine Day" for gettin' hitched. I just can't wait to finally see that diamond wedding ring on my finger. (My hubby-to-be keeps singing strains of "Why Me?") While on the subject of gems, **Tony Carey** has proven to be quite a multifaceted solo artist, probably in no small part due to the MKS-10 Planet-P rack-mounted piano module that he uses. Honestly, Tony is originally from Fresno—I mean Fresno—California, so you can understand why he feels that his Jupiter-8 polyphonic synthesizer and MSQ-700 Digital Keyboard Recorder are an absolute necessity in a Pink World.

Since I've known him for a while now, I feel pretty confident that after we're married my man won't turn out to be a Perfect Beast. I suppose I can always call on **Danny "Kootch" Korchmar** and his GR-700/G-707 guitar synthesizer module, as **Don Henley** did, if I ever take a mind to re-Building him. They built a beast who can drive with his eyes closed. Come to think of it, that sounds remarkably like my future husband! I guess I'm just "Lucky in Love."

(Can I let you in on something confidentially? I know "Secrets" are hard to keep, but for your information **Mick Jagger** is singing about me on "She's the Boss," with accompaniment by a Juno, BOSS CE-2 Chorus pedal, and the very recognizable style of GR player **Jeff Beck**. I don't want my man to find that out until after we tie the knot!)

Oh well, Hawaii here we come! We managed to book one of those great airline package-tours. I wonder if we'll run into **Leon Russell**? He will be on tour too, with his MKB-1000 MIDI Keyboard Controller, JX-8P polyphonic synthesizer, and new BOSS BX-800 eight-channel stereo mixer. Now that I think about it, it's not likely that we'll see him on the Islands at all because he



Photo by Steve Rapoport

Howard Jones will play Roland gear whenever and wherever he gets the chance—even in a London tube station!

usually travels in a HUGE touring bus. (We at Roland affectionately call it "The MIDI Bus.") I really do prefer flying to surface transportation, and so does **Earl Falconer** of UB-40 who is flying high with his BOSS Phaser, Delay, Equalizer, and Chorus pedals. Among fellow band members, **Mickey Virtue**'s got a Jupiter-8, and both **Ali and Robin Campbell** use the GR-700 guitar synthesizer to create reggae-influenced compositions that are a Labour of Love.

While I'm languishing at that famous Hawaiian surfing beach The Pipeline, I'll be thinking of the **Tubes** and their brand new SRE-555 Chorus Echos. I bet they won't even miss me when I'm gone. Before I take off, let me ask you: Is it true that **Jimmy Page** and pals gave a free concert on **Firm** ground at Three Mile Island? Jimmy's GR-700/G-707 guitar synthesizer and BOSS foot pedals seem a little "Radioactive" as they glow in the "Midnight Moonlight." Maybe I'm just anticipating the influence Maui (Wowie!) will have on me. Till next time, Mahalo Aloha Roland users. 

Random Noise spotlights the current activities of Roland and BOSS users. If you have news that you think will interest readers, please notify us.

Innovative music peripherals in compact, affordable packages.

RDD-10: A High-Quality Digital Delay

The RDD-10 Digital Delay is compact and provides many superb functions applicable to a variety of applications. Offering a delay of from 1.5 to 400 milliseconds which can be adjusted by a nine-range selector and a fine control, the 12-bit PCM system plus analog logarithm compression ensures superb sound quality. The frequency response ranges from 40 Hz to 16kHz.

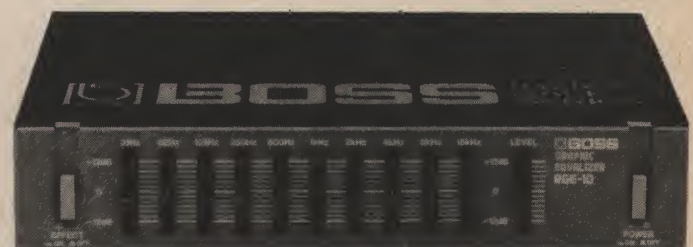
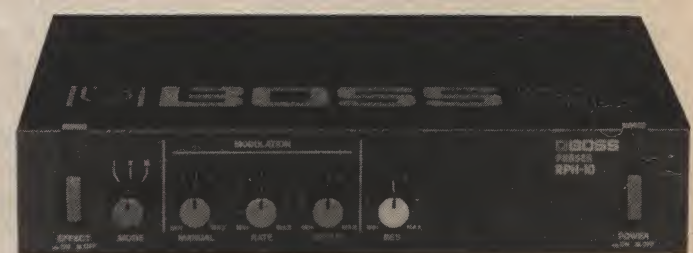
The RDD-10 features Modulation Rate, Modulation Depth, Feedback Level, and Delay Level controls. In

addition, a Delay Tone control is provided to produce natural echo effects—especially effective for vocals. Two outputs—Mix Out and Delay Out—are provided. The Mix Out puts out both the direct and delay signals, while the Delay Out puts out only the delay signal.

When two RDD-10s are used at a time, the Modulation BUS jack and the Polarity switch allow the modulation of two units to be interlocked, producing

incredibly rich effects. Phone and RCA jacks are provided for both the input and output. A selector switch simultaneously sets the input and output level at -10 or -20dBm. The RDD-10 can be used with any electronic devices, from an instrument to hi-fi equipment. This unit is also remote controllable using the optional FS-1 foot switch, and switching occurs without unwanted click noises. The suggested retail price of the RDD-10 is \$275.

BOSS Micro Studio Series



RBF-10: High Performance Flanging

The new RBF-10 achieves exceedingly clear flanging effects by incorporating a noise-reduction system to provide high sound quality and offering many superb features that meet professional recording standards. In addition to the rate (100 milliseconds to 6 seconds) and depth controls, the modulation adjustments provide a Manual control to control the frequency at which the flanging occurs. This allows the RBF-10 to produce a wider variety of effects. The feedback level and the balance between direct and effects signals can also be freely adjusted.

Two outputs—D + E (direct signal with non-inverted effects signal) and D - E (direct signal with inverted effects signal)—make it possible to achieve stereo flanging from a monaural source. A Modulation BUS jack and Polarity switch are also provided. When two RBF-10s are used at a time, exciting effects are possible by interlocking the modulation of the two units. Phone and RCA jacks are provided for both the input and output. A selector switch simultaneously sets the level of the input and output at -10 or -20dBm. The flanging effects can be turned on and off using the optional FS-1 foot switch. The suggested retail price of the RBF-10 is \$160.

RCL-10: A Lot in a Small Package

The extremely cost-effective RCL-10 offers all the functions of compressor, limiter, expander, and noise gate units. It can be used in a variety of ways: as an ordinary compressor/limiter, as a deesser or to produce the gated reverb, and with any electronic devices, from an instrument to hi-fi equipment.

The attack time and the release time can be individually adjusted, and a

Noise Gate function eliminates unwanted sound or leakage. A stereo Link jack is provided to interlock the operation of two RCL-10s and the Key In jack allows the unit to be controlled by external signals. The Overload indicator warns of all overloads and the Gain Reduction indicator shows the operation status of the compressor and expander. Phone and RCA jacks are provided for both the input and output. A selector switch simultaneously sets the input and output level at -10 or -20dBm. The RCL-10 is remote controllable using the optional FS-1 foot switch, and switching occurs without unwanted click noises. The suggested retail price of the RCL-10 is \$160.

RGE-10: Versatile Graphic EQ

The RGE-10 graphic equalizer provides ten octave bands: 31, 62, 125, 250, 500, 1k, 2k, 4k, 8k, and 16kHz. An LED on each level slider allows the user to confirm the setting at a glance. The Total Level control balances the level difference between equalized and normal settings. Phone and RCA jacks are provided for both the input and output. A selector switch simultaneously sets the input and output level at -10 or -20dBm. The compact RGE-10 can be used with any electronic device, from an instrument to hi-fi equipment. The unit is also remote controllable using the optional FS-1 foot switch, and switching occurs without unwanted click noises. The suggested retail price of the RGE-10 is \$160.

RPH-10: Low-Noise Phase Shifting

The RPH-10 features three operation modes to produce three different kinds of phase shifting effects. In addition to Rate, Depth, and Resonance controls, a Manual control is provided to change the center frequency at which the phase shifting occurs. A wide variety of effects can be produced using these controls.

The noise-reduction system keeps the sound clear at all times by eliminating unwanted noises that other phase shifters are prone to produce. A Modulation BUS jack and Polarity switch are provided, and when two RPH-10s are used at a time, impressive effects can be produced by interlocking the modulation of two units. Phone and RCA jacks are provided for both the input and output. A selector switch simultaneously sets the input and output level at -10 or -20dBm. The RPH-10 can be used with any electronic device, from an instrument to hi-fi equipment. It is also remote controllable using the optional FS-1 foot switch, and switching occurs without unwanted click noises. The suggested retail price of the RPH-20 is \$160.

RAD-10: Easy Adapter

The RAD-10 rack-mount adapter (not pictured) allows two BOSS Microrack units or Roland MIDI accessory units (except the MI-10) to be mounted on a 19-inch EIA rack. These units are fixed on the RAD-10 using only a single screw. The suggested retail price of the RAD-10 rack-mount adapter is \$19.95.

DF-2: Monster Masher

BOSS's unique and upgraded Distortion and completely new Feedback circuits have been incorporated within BOSS's famous Compact Pedal. No matter what kind of guitar or amplifier you use—and no matter where you play—the DF-2 will provide you with exactly the feedback you desire. In fact, you can now enjoy feedback even when using a headphone amplifier. The feedback sounds last as long as the pedal is pressed, and the Over Tone control determines the balance between the unison and upper octave sound. The upgraded distortion circuitry can produce a full spectrum of distortion sound. The Tone control tailors the tone color, the Distortion control adjusts the amount of distortion, while the Level control determines the output level of distortion sound to match or contrast it with direct sound. The two-mode switching function makes it possible to use a single pedal to select the normal, distortion, or feedback mode.

The DF-2 gives you the ability to control infinite feedback at your discretion. Previously, guitarists had to experiment with the location of the guitar in relation to the amp. The DF-2 also produces harmonics up to one octave above normal guitar, which could only be done previously by scratching the strings with a pick and "popping" the harmonic.

Used in combination with the BOSS DD-2 Digital Delay it's possible to "feedback" a note with the DF-2 and hold it with the Hold setting on the DD-2. You can then feedback a second

note with the DF-2 and have two notes feedbacking indefinitely in harmony.

The DF-2 can also be used as one of the rawest distortions on the market when not being used to generate feedback. By rolling the Distortion control all the way off, then playing a note and depressing the pedal, clean feedback can be produced. The suggested retail price is \$99.50.

DI-1: Low Cost, High Performance Direct Box

The direct box has become one of the essential pieces of equipment in the recording studio and for P.A. use. A durable but inexpensive direct box is a must for demanding engineers, and the new DI-1 is just this. It employs active circuitry instead of the conventional transformer for minimum tone deterioration and maximum durability. The DI-1 operates on a 9-volt battery or phantom power from a mixer. The Auto Power On/Off circuit automatically cuts the power when the DI-1 is not in use, and automatically changes the power source from the battery to phantom power when the phantom power is fed into the DI-1.

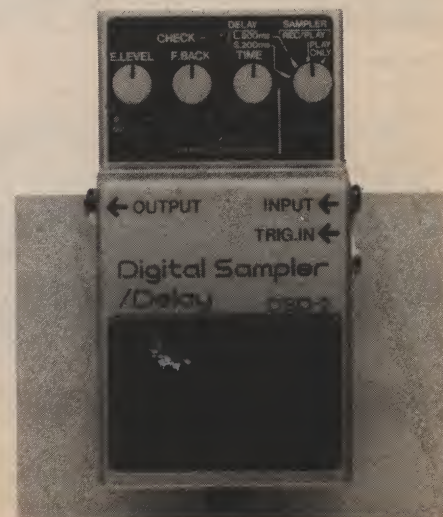
The input impedance is high enough to accommodate any kind of instrument. The Input Level Attenuator switch selects input attenuation at 0, -20, or -40dB. Two switches are provided for balanced output. The Phase switch changes the polarity, and the Ground switch cuts the ground line between the input and output. Parallel and unbalanced outputs are also provided. The DI-1 ensures sound quality acceptable for professional use at an affordable suggested price of \$125.

DSD-2: A Compact Sampling Machine

Advanced technology from BOSS has made it possible to pack a digital sampling machine and digital delay within a compact pedal. The extremely cost-effective DSD-2 can be used as either a digital sampling machine or as a digital delay, offering greater creative possibilities in both recording and performance.

When used as a digital sampler, there are two operating modes: Rec/Play and Play. In Rec/Play mode, you can record and replay samples simultaneously. By setting the Feedback control at the maximum position, you can overdub another sample sound onto a pre-recorded one. In Play mode, only replay may be used. A recorded sample sound can be replayed by depressing the DSD-2 pedal or by feeding an external trigger signal into the unit. The pitch of the replay can be varied using the Time control. Incorporating a 12-bit A/D/A converter, the DSD-2 offers a frequency response ranging from 40Hz to 7kHz. The sampling time is variable 200 to 800 milliseconds.

When used as a digital delay, the DSD-2 offers delay ranging from 50 to 800 milliseconds. The delay time is set by selecting S (50 to 200 milliseconds) or L (200 to 800 milliseconds) mode, and by adjusting the Delay Time control. It's also possible to control the delay time via external trigger signals. The suggested retail price is \$295.



Creative tools on the cutting edge of today's music technology.

Think Systems!

If you really want to accomplish something, you can do it—practically anything—if you have a system. Systems are all around us, all the time. We're always trying to "beat the system," but we, too, *are a system*. Body and brain.

We even create innovative, complex systems to extend the ones we already have: The automobile becomes an extended body, the microcomputer an extended brain. Social groupings from corporations all the way down to garage bands are systems of human interaction—information systems.

To compose a song, record a demo, or perform live music you need an appropriate system. Picture this: Your goal is to be able to compose music at home easily, without incurring astronomical costs or disturbing the neighbors, and then turn your compositions into recorded demos.

A typical home composition system can be centered around Roland's new Piano Plus HP-100 with MIDI. (See diagram.) With a seventy-six key, touch-sensitive keyboard; three piano sounds, a harpsichord, and chorus effect at the touch of a button; two built-in speakers and a jack for optional headphones—this unit alone is sufficient for writing hit songs. It becomes even better when you take advantage of its MIDI capability (with full channel assignability) by hooking it to the Rhythm Plus PB-300 to provide a backbeat and the MSQ-100 Digital Keyboard Recorder to create and record song arrangements.

All you've got to do is play chords with your left hand and the HP-100 will supply automatic accompaniment of the chord and arpeggio while the PB-300 automatically supplies the bass and drums. Record your basic song with the MSQ-100 (memory capacity approximately 6,100 notes), then work out an arrangement for it by recording overdubs—as many as you'd like (within the eight-voice capability of the HP-100). You can easily store all MIDI song data, including overdubs and program changes, to a handy cassette tape. Having a cassette of the MSQ-100 MIDI data literally makes all your work completely "transportable."

Now it's time to turn that song into a real demo to play for record company scouts, music publishers, film producers, record-

MIDI HOME SYSTEM

MSQ-100 DIGITAL KEYBOARD RECORDER

MIDI In	MIDI Out
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PB-300 RHYTHM PLUS

MIDI In	AUDIO Out
MIDI Thru	AUDIO In Mono

PIANO PLUS HP-100 ELECTRONIC PIANO

The newest addition to the Piano Plus series of electronic pianos, the HP-100 provides seventy-six keys with touch sensitivity and is light, compact and easy to carry. Four different instrument sounds—three piano and a harpsichord—can be selected at the touch of a button. A Chorus effect is provided to broaden and thicken the sound. The Key Transpose function enables you to transpose to any key at the touch of a button. Accessories include music stand and damper pedal.

The sound is amplified through two speakers built into the right and left sides of the unit, and each has five watts of power. Headphones can also be connected. A stereo device, such as a

tape recorder or two monaural devices, can be connected to the stereo input jacks so you can play along with recorded music. External amplification through a hi-fi system or a keyboard amp can be connected to the stereo output jacks for increased volume.

The MIDI In, Out and Thru jacks and complete MIDI channel-assign capability allow the Piano Plus 100 to be used as a keyboard controller for other MIDI devices such as the MKS series MIDI sound modules. The HP-100 can also be used as an external sound source for a MIDI sequencer. The suggested retail price of the Piano Plus HP-100 Electronic Piano is \$795. (With optional stand, \$860.)



ing artists—whatever. You can take the cassette containing your song data to a small, MIDI-capable recording studio that also uses the MSQ-100, or has access to one. Load in your song, then use what MIDI instruments the studio has available to develop your arrangement. Assign the parts you've sequenced to various instrumental sounds using MIDI channel select until everything feels just right.

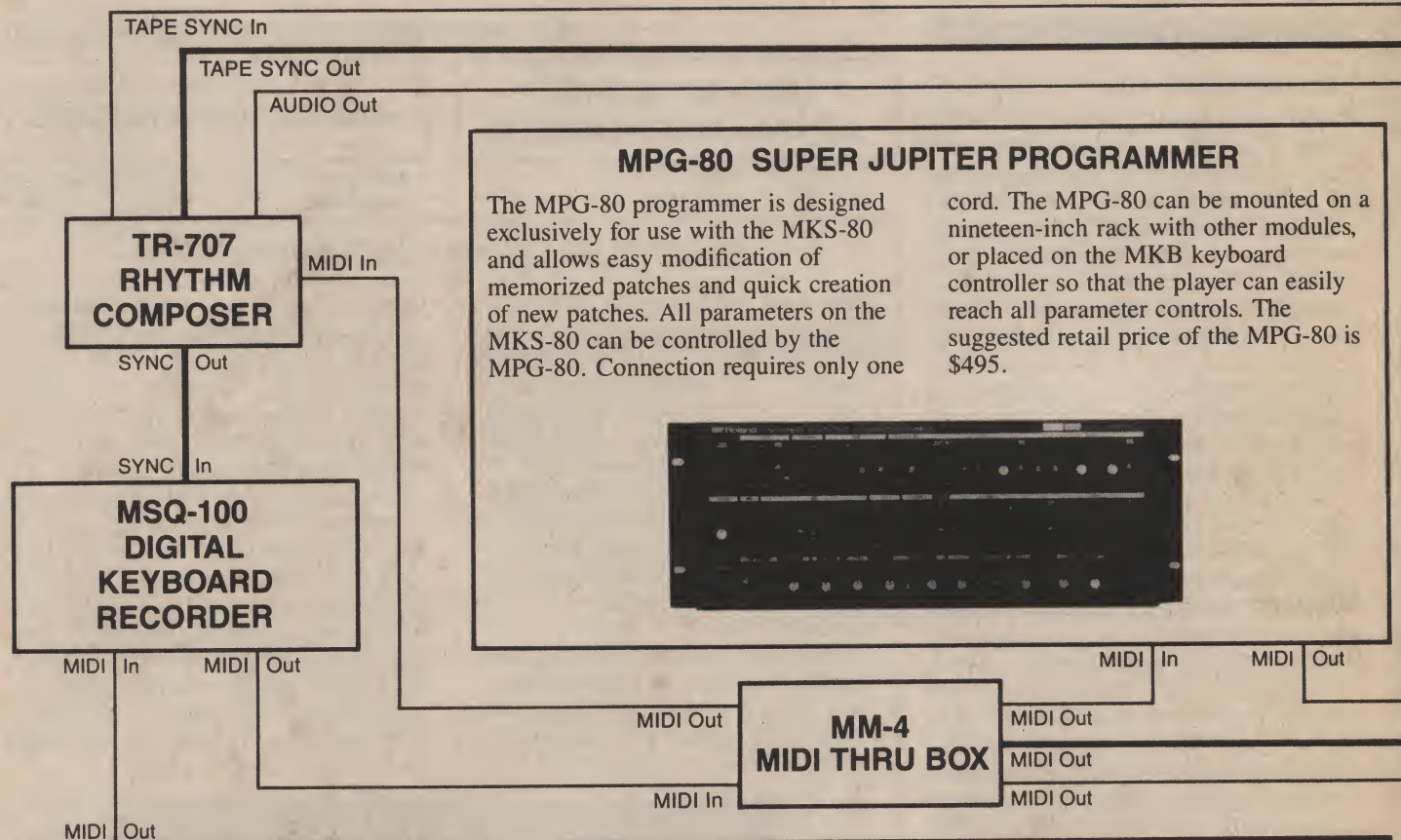
A typical small MIDI demo studio can be built around the Roland MKS-80 Super Jupiter with MPG-80 Programmer and the MKB-300 or 1000 as Keyboard Controller. (See diagram.) As a rhythmic source the TR-707 Rhythm Composer (with MIDI) is a perfect counterpart, offering fifteen different digitally recorded sounds, storage of up to sixty-four rhythm patterns (with optional memory cartridge that triples this capacity), an easy-to-read liquid

crystal display, and separate audio outputs for each sound.

Pivotal to the whole system is the big little MM-4 MIDI Thru Box, which enables the interconnection of different MIDI devices by providing one MIDI-In jack and multiplying its data signal to four MIDI-Out jacks. All MIDI data—sequences, instrument settings, and patch changes—can then be recorded and played back by the MSQ-100, including the front panel settings (except the input attenuator) on MIDI effects such as the new SRV-2000 Digital Reverb and SDE-2500 Digital Delay, outboard gear that's a must for producing professional-sounding demo tapes.

Putting it all together—from turning a feeling into a song into a demo into a record deal—can be easy if you think systems!

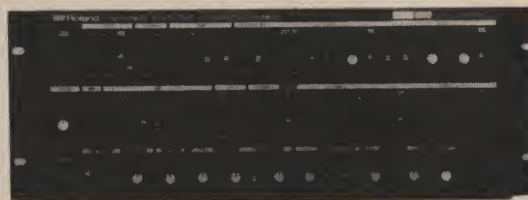
MIDI DEMO STUDIO SYSTEM



MPG-80 SUPER JUPITER PROGRAMMER

The MPG-80 programmer is designed exclusively for use with the MKS-80 and allows easy modification of memorized patches and quick creation of new patches. All parameters on the MKS-80 can be controlled by the MPG-80. Connection requires only one

cord. The MPG-80 can be mounted on a nineteen-inch rack with other modules, or placed on the MKB keyboard controller so that the player can easily reach all parameter controls. The suggested retail price of the MPG-80 is \$495.



MKB-1000/300 MIDI KEYBOARD CONTROLLER



The MKB-series keyboard controllers—the MKB-1000 and the MKB-300—completely revolutionize multi-keyboard playing. Sounds are produced by devices connected to the MKB keyboard controllers through MIDI. In turn, the MKB keyboards send MIDI data to control any connected sound sources. All the controls needed to select MIDI data are on the front panel for easy operation. MKB keyboard controllers can memorize up to 128 control settings for instant recall at any time. Stored programs are protected by a back-up battery.

The MKB-1000 has eighty-eight wooden keys and the MKB-300 has

seventy-six keys. All are touch-sensitive and will sense the most subtle nuances in musical performance. These keyboard controllers are connected to MIDI sound-producing units, such as the MKS-80, MKS-30, and MKS-10 sound modules, by a single cord. No matter what kind of sound you require, no matter how many sounds you wish to produce, all can be played using a single MKB keyboard controller.

Both the MKB-1000 and MKB-300 are velocity-sensitive so that even the slightest changes in touch are converted into MIDI velocity information. A ten-step Dynamics select switch adjusts the velocity-sensitivity to your taste. The

Floating split function allows the split point between the upper and lower parts of the keyboard to be assigned at will, and the display indicates the key name on which the split point is located.

These MKB keyboard controllers send MIDI program change information to recall the patch of a connected sound source. MIDI channels can be assigned individually for the upper and lower parts of the keyboard, and the operation mode (Poly or Mono) can be assigned for each of two MIDI channels with the Mode switch.

Bender and modulation information can be sent on both the upper and lower channels or on only the upper channel, and the depth and rise time of the modulation are adjustable using slider controls. Modulation can also be turned on and off using a pedal switch. Key tranpose is easy, even during a performance, using a slider control. Optional KS-1000 and KS-5 stands are also available for the MKB-1000 and MKB-300 respectively. The suggested retail price of the MKB-1000 is \$2195, and the MKB-300 is priced at \$1295.

MKS-80 SUPER JUPITER

Roland's Jupiter synthesizers have always been the best performance-oriented synthesizers because of their durability, versatility, and unsurpassed sound quality. Now their numerous features are combined with more exciting new ones in the compact, rack-mountable Super Jupiter MKS-80.

This new eight-voice polyphonic programmable synthesizer module provides two powerful VCOs per voice. It can be controlled by any MIDI sending unit. It's also velocity sensitive and possesses aftertouch capability. All the legendary Jupiter sounds can be produced with dynamics for more

powerful, more expressive sounds than ever before. The unit features sixteen VCOs, eight VCFs, eight VCAs, sixteen ENVs, and numerous other parameters required for advanced sound creation.

The MKS-80 offers 192 patches and 192 patch preset pairs; the MKS-80 itself stores 64 patches and the accessory M-64C memory cartridge stores up to 128. More outstanding control parameters are provided than you'll find on the Jupiter-8, and they can be controlled by the MKS-80 or the optional MPG-80 programmer.

The Edit function allows the patches and patch preset pairs to be freely modified. The Unison Detune function allows the MKS-80 to produce extremely thick sounds. When the MKS-80 operates in the Unison mode, the pitch of each VCO is slightly shifted. Octave transpose is possible two octaves above and two octaves below.

Just as Jupiter synthesizers have before, this Super Jupiter, priced at \$2495, is certain to meet the severe demands of creative professionals.



MIDI In

MIDI In

To SRV-2000 Digital Reverb

AUDIO Out

SDE-2500 DIGITAL DELAY

As the fourth model added to the popular SDE series of digital delays, the SDE-2500 Digital Delay with MIDI features the Digital Compounding PCM system equivalent to a 15-bit A/D/A converter to obtain the dynamic range of 96dB, THD of 0.05%, and S/N ratio of 84dB. In addition, all analog circuits are constructed with discrete amplifiers to produce exceedingly clear, pure sounds.

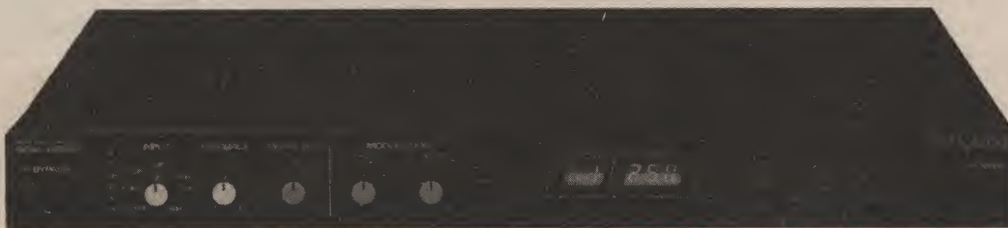
This unit can produce a delay of up to 750 milliseconds. The frequency response is from 10Hz to 17kHz when

the delay time is set between 0 and 375 milliseconds, the most frequently used delay range. Delay time is set in increments of 0.1 millisecond from 0 to 10 milliseconds, and in increments of 1 millisecond for times over 10 milliseconds, so that any kind of effect, including flanging, chorus, doubling, and echo effects, can be accurately produced.

The SDE-2500 can store up to sixty-four kinds of settings of all front panel controls (except the input attenuator). The stored data can be freely modified

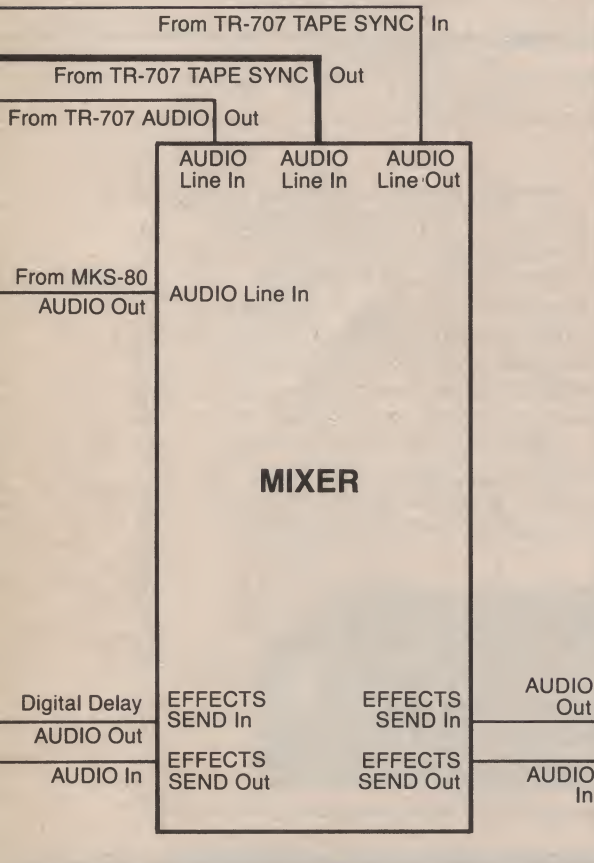
in real time. MIDI In and Thru jacks are provided. Settings stored in the SDE-2500 can be recalled using MIDI program change information.

The SDE-2500 also features convenient remote jacks: Delay On/Off, Hold On/Off, Playmate, Preset Shift (Up, Down), and Modulation CV In, and two output jacks: Mixed (the delay and the direct signals are mixed) and Delay (only the delay signal is put out). The suggested retail price of the SDE-2500 Digital Delay with MIDI is \$795.



AUDIO Out

AUDIO In



SRV-2000 DIGITAL REVERB

The new SRV-2000 Digital Reverb offers versatility, flexibility, and the sound quality you expect from a professional unit—all at a reasonable price. The SRV-2000 can store up to thirty-two settings of all front panel controls (except the input attenuator). The programmed data can be freely modified in real time. The pre-delay time, reverb time, high-frequency damping, room size, gate time, and output level can be precisely set while confirming the value as indicated on a digital display.

The SRV-2000 features two digital equalizers—a Low Frequency Control and two Band Parametric Equalizer—to accurately tailor the sounds. These can also be precisely set while confirming the value as indicated on the digital display. You can adjust the equalizers to

best suit each reverb setting and then store both the equalizer and reverb settings in the SRV-2000's memory.

The SRV-2000 is MIDI-compatible, with both MIDI In and Thru jacks. Settings stored in the SRV-2000 can be recalled using MIDI program change information.

Four remote jacks are provided: The Eternity On/Off and Add On jacks are to produce an infinite reverberation; the Effect On/Off jack is to turn only the effect on and off; the Preset Shift jack is to change the stored setting one to another. Stereo outputs allow for reproduction of more realistic, spacial reverberation. The suggested retail price of the SRV-200. Digital Reverb with MIDI is \$1495.



MIDI In

MPU-101 MIDI to CV Interface

The MPU-101 MIDI to CV Interface allows a MIDI sending unit to control up to four CV/Gate synthesizers. The MPU-101 has four output channels, each with pitch control voltage, gate signal, and dynamics control voltage outputs. The Gate indicator on each channel confirms the flow of the gate signal. The MPU-101 also has control voltage outputs for bender, modulation, after-touch, and volume. Five operation modes are provided for an array of applications.

In addition to the MIDI In and Thru jacks, a MIDI Out jack is provided. When MIDI key information beyond the converting capacity of the MPU-101 is inputted, the key information not converted into the CV/Gate signal is sent to the MIDI Out jack. MIDI data for up to eight notes can be converted into the CV/Gate signal by combining two MPU-101's. Three assign modes and a three-range Octave Transpose function offer more possibilities. The MPU-101 also allows any kind of voltage

controlled device, such as a lighting equipment, to be controlled by MIDI data. The suggested retail price of the MPU-101 is \$295.

MPU-104 and MPU-105 MIDI Selectors

The more MIDI devices you use, the more involved their interconnections may become. The MPU-104 and MPU-105 were developed to make life easier for the MIDI musician.

The MPU-104 MIDI Input Selector has five MIDI In and one MIDI Thru jacks. The MIDI Thru Jack sends the MIDI data received by a selected MIDI In jack. Selection is made using five Connector Number Select switches, with an LED on each to confirm your selection.

The MPU-105 MIDI Output Selector has one MIDI In and five MIDI Thru jacks. A Connection Number Select switch is provided for each MIDI Thru

jack to select whether or not it sends the MIDI data received by the MIDI In jack. An LED on each switch shows whether it is off or on. A MIDI Indicator is illuminated when the MIDI In jack is receiving the MIDI data. The suggested retail price of the MPU-104 MIDI Input Selector is \$90. The MPU-105 MIDI Output Selector is priced at \$110.

MPU-103 MIDI Channel Filter/Converter

The MPU-103 MIDI Channel Filter/Converter accepts only MIDI data transmitted on the MIDI channel determined by the Filter Channel Select switch setting. It then sends that data on the MIDI channel determined by the Converter Channel Select switch setting. MIDI data other than the key information can be eliminated using the Key Event On/Off switch. The MIDI indicator lights when the MIDI data is being accepted. The suggested retail price of the MPU-103 MIDI Channel Filter/Converter is \$260.

Roland Music Software Series

MUSE

MIDI Users Sequencer / Editor

MUSE is an advanced software system for sequencing/recording, editing, composing, and performing music with electronic MIDI musical instruments, a Roland MPU-401 and an Apple IIe or Commodore 64 computer.

MUSE

MUSE is an advanced software system for sequencing/recording, editing, composing, and performing music with electronic MIDI musical instruments.

Music composition and performing are very spontaneous acts. MUSE permits the recording of these spontaneous expressions because it works the way you think musically.

Start with a musical idea, select a track, and record MIDI performance data in real time. Play the music back right away and easily change any measure of it with the powerful cut-and-paste editing features MUSE provides. Record on 8 individual tracks, then time correct, transpose, or merge them. Auto-locate and punch-in at any measure. Assign tracks to any of 16 MIDI channels. Cursor key or joystick control allows you to move between all program functions instantaneously. MUSE permits you to continuously interact with the music until the composition is complete.

Features

- 8 tracks of recording and overdubbing
- Approximately 6,000 notes per song
- Optional joystick or paddles for fast and easy use
- Compatible with any MIDI instruments
- Cut-and-paste editing by measure
- Insert, delete, move, or copy any part of track by measure
- Punch in and out by measure
- Auto-locate to any measure
- Looping by track length or song length
- Merge to increase available tracks
- Transposition of individual tracks
- Channelization of individual tracks
- Time correction of any tracks
- Filtering out of after-touch, program changes, or modulation wheel if desired
- Record to a metronome or in free time
- Muting of any tracks
- Saving and loading to disk for high-speed access
- Tempo save
- Sync to tape or other MIDI clocks (Tape sync not available with MPU-APL or MPU-C64)

Hardware Required:

Apple IIe (64K) or Commodore 64 Disk drive and CRT monitor
One of Roland's Intelligent MIDI interfaces:
MPU-401 MIDI Processing Unit and MIF-APL interface card
MPU-APL, internal MPU card for Apple IIe
MPU-C64, for Commodore 64
Any MIDI-equipped instrument(s)
Joystick, trackball, or paddles are recommended options

Roland Music Software Series

MPS

Music Processing System

MPS software is designed to work with the IBM Personal Computer. When combined with Roland's MPU-401 MIDI Interface and MIDI-equipped musical instruments, you have a powerful and versatile music production system.

MPS Software integrates MIDI-equipped electronic musical instruments with the microcomputer into a perfectly harmonized music-making system. Like word processing software, MPS allows you to create and develop your ideas into complete musical compositions.

Hardware Required:

IBM-PC or full compatible (256K minimum, up to 640K)
2 disk drives recommended
IBM color graphics card and CRT monitor
Roland MIF-IPC interface card
Roland MPU-401 MIDI Processing Unit
Any MIDI-equipped instrument(s)
Optional dot matrix graphics printer (IBM compatible)

MPS functions in 3 modes:

Song Mode: Record and play back MIDI performance data in real time on 8 tracks and 16 MIDI channels. Build a composition in blocks by rearranging the musical phrases you create and merging tracks. Standard features include transpose, auto-correct, punch-in, and sync to tape.

Score Mode: Transfer musical phrases you've recorded to a staff, creating a highly legible, musical score. You can then easily edit or step load individual notes one at a time. The score can be played back as it's being displayed in real time.

Print Mode: Cut and paste allows you to format your score on the hi-res screen, then save it to disk. Print out single parts for individual players or the entire composition as a conductor's score.

Each mode consists of different "pages," each with an individual screen display and set of functions. A System page acts as a bridge between the modes. Select the functions on each page with the IBM-PC's function keys, shown on screen for easy reference.

MPS uses no complicated commands or key-stroke sequences. Clear messages and menus help you in an intuitive way to express your musical ideas to the fullest.

Song Mode, Arrange Page



Score Mode, Analysis Page

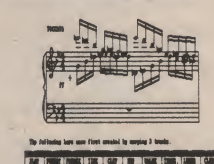
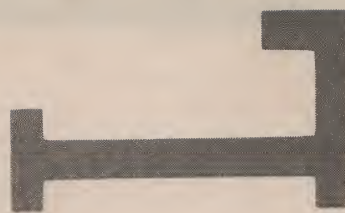


Chart of Modes, Pages & Functions

System Page									
Song Mode		Print Mode		Score Mode		Analysis Page		Edit Page	
new song	arrange page	print page	analysis page	edit page					
new name	name	start	stop	start	stop				
time	time	start	stop	start	stop				
transpose	transpose	start	stop	start	stop				
velocity	velocity	start	stop	start	stop				
channel	channel	start	stop	start	stop				
time base	time base	start	stop	start	stop				
tempo	tempo	start	stop	start	stop				
new time	new time	start	stop	start	stop				
help	help	start	stop	start	stop				



There is an urbane ease to the way Philip Glass carries himself—a precise grace and a cautious curiosity. His eyelids settle at half-mast and his fingers cross with a deliberate gentleness. One can as easily imagine him bending over his kids' homework as over one of his renowned scores. Fame may have been slow in coming, but he wears it well.

Glass now occupies one of the most distinguished niches in the world of modern concert music. His three "portrait" operas, *Einstein on the Beach*, *Sat-yagraha* and *Ahknaten*, have redefined the parameters of modern opera. His collaborations with choreographers like Andrew de Grant, Lucinda Childs and Jerome Robbins of the New York City Ballet—with pop performers like Paul Simon, Brian Eno and the Davids Bowie and Byrne—as well as with noted stage designer/director Robert Wilson have enabled him to assume stature in several adjacent disciplines. Film scores for the movies *Koyaanisqatsi* and *Breathless* brought his work to a much broader public, as did his compositions for the opening and closing ceremonies at the L.A. Summer Olympics. *Glassworks*, his first album under a lifetime CBS Masterworks contract, quickly sold over 100,000 copies. Only two other composers have ever been signed to the Masterworks series—Stravinsky and Copland.

Glass has always inspired controversy among the critics. In the mid-sixties, the art world buzzed with words like abstract, process and minimalism and Glass's early pieces mirrored this emphasis. Their stripped-down rhythmic patterns were generated by a pulsing overlap of simple, repetitive motifs. His supporters cite these works as seminal influences that filled a void that had grown up between the rigid mathematics of serialism and the chancier indeterminacy of Cage and his school. Glass's newer, more elaborate works are seen by many as the mature flowering of a visionary who is reinvesting modern music with a sophisticated romanticism.

Detractors, on the other hand, yawn and mutter criticism like pastel, slick, humdrum, sentimentalized and harmonically limited. They claim that he offers no challenges, that he panders to a feel-good, comfortable mentality.

In any case, his impact has been profound and tracing his history is enlightening, not only for the insights it offers onto his own creative universe, but also for the unique window it allows onto the performing arts world of the past twenty years. Few major artists have contributed to more mediums and fewer still possess the perspective, savvy and diligence necessary to continually rise to the top.

—SUZANNE STEFANAC/COURTESY: ANOTHER ROOM MAGAZINE.



A TO T

PHILIP GLASS
PLUS PRODUCER
KURT MUNKACSI
AND KEYBOARDIST
MICHAEL RIESMAN
INTERVIEWED BY
JEFFREY RONA



Photos by Ziya Danismend



Kurt Munkacsi

Before you made a living as a composer, you were driving a cab. While you did that, what was going through your mind musically?

Glass: I was writing *Einstein on the Beach* when I was driving a cab. The cab driving went right up to *Satyagraha*, to 1979. What was I thinking about? I was thinking about the music I'm writing now—it was very recent. I wasn't born rich so I had to work. If you're asking if I made a living with music—no, I wasn't a school teacher, a music teacher, and I didn't do commercial music. I didn't write commercial film music. There are other ways of making a living in the music world as composer, I didn't do that either—I was committed to working with my Ensemble. I didn't think the money in doing commercial music was a good trade-off on my ability and talent.

What are your musical influences?

Glass: I'm very interested in a lot of things, I leave out very little. I guess the area I really leave out is improvisation because I don't know how to do it. I never was an improviser. I wasn't trained that way. I come from a tradition of notated music. I don't know anything about improvisation so I've avoided it—except for one brief

moment in *Einstein on the Beach* where there's some improvised playing, but it doesn't appear in the music. I've had the great luck of being exposed to a lot of non-Western music in terms of what I draw from. I'm interested in all kinds of music.

Did you first encounter non-Western music in school?

Glass: They didn't do it in schools in those days. I went to school in the early '60s when non-Western music was considered primitive music, and you didn't study it. Or it was called ethnomusicology. I went to India and North Africa. Nowadays you can just sit in New York and hear everything! In the '60s you had to go out to find it and I did, and there were also some good records.

(To Munkacsi and Riesman)

How long have both of you worked with Philip Glass, and how did you first get involved in the Ensemble?

Riesman: I've worked with Philip ten and a half years, now. Before that I taught theory and composition at the State University of New York, and before that I was a graduate student and teaching at Harvard. I wanted to get out of the academic world, so I just started looking for work around town; and I gave a solo piano concert that was attended by a member of the Philip Glass Ensemble. Philip was looking for a keyboard player, so I was suggested and we got together. That's how it happened.

Munkacsi: I've been working with Philip now actually longer than I care to think about, but it's probably been about twelve years. Before I met Philip I was a rock-and-roll bass player. Then I became more interested in engineering, in the production side, than in playing bass. When I met Philip I was a young engineer, just starting out.

As a matter of fact, I was working with John Lennon. It was just after the Beatles broke up, and he had moved to New York and was living in the West Village on Bank Street. He had a sixteen-track mobile recording studio with four or five engineers working for him, and I was the junior engineer. I coiled the cables and cleaned up, all that sort of stuff. Philip wanted to make his first record and somehow through Yoko and the art world they gave him the mobile studio to use on the weekend. Since I was the junior engineer, I was the guy sent out on it because it was a free recording. I heard Philip's music and I really liked it. At that point Philip was amplifying it but he really didn't know what he was doing or have any direction. Since I liked the music, I wanted to see what would happen if I took what I had learned in pop music to create a really present, bright, loud sound and apply that to his music. That's what I did and that's what we've been working on ever since.

How was the Philip Glass Ensemble started?

Munkacsi: The way the Ensemble got started is very funny. Phil's music was so weird he couldn't get any regular organizations to play it, so he had to get his own bunch of musicians to play it. Any classical chamber orchestras would say "Whaaat?" The Ensemble is always used in the recordings if Philip has written music for the instruments they play. The Ensemble consists of



Michael Riesman



three wind players, a singer, and a couple of keyboard players. Whenever we need winds we always use them to play the part. *Satyagraha* was an exception because we were working with an existing orchestra. Michael [Riesman], who's the main keyboard player, is also our conductor and our music director.

[To Glass]
When did you first work with a synthesizer?

Glass: The first synthesizers we used were a Farfisa and a Mini Compact, and the Yamaha YC-45D—whatever it is—the one with the big double keyboard. We waited for them to become polyphonic. Synthesizers have been around for a long time before we started using them. I was interested—always—in synthesizers as live performance instruments. Until they became polyphonic, which meant practically until 1977 or 1978, they weren't useful to us. We could get along fine with the electric organs. Now, of course, it's expanded the palette of the Ensemble.

How did this change in technology affect the way you use the keyboards?

Glass: I use them differently. For example, in the *Akhnaten* or the *Koyaanisqatsi* material we've been playing with the Ensemble, some of that was originally written as brass parts. Those are not keyboard parts, but I have a keyboard player playing them. It's a different finger technique.

I look at it two ways: First, there are pieces that are adapted from symphonic and orchestral pieces, where I originated the idea actually using a real orchestra. That's what happened with the *Akhnaten* material. That was originally written for an opera-type orchestra. In order to have that music available as repertory in the Ensemble it became adapted. There are instruments we don't have in the Ensemble—clearly the brass and strings—we're able to do all that using synthesizers. That's one way. I sometimes write scores that are directly for synthesizers, the others are adaptations from orchestra music. In both cases we're always mixing acoustic and electronic instruments. In the scores just for synthe-

sizers, I still indicate generic sounds, for example, I will often indicate a general woodwind synthesizer sound or a string synthesizer sound. I've written parts that call for a specific synthesizer sound.

At this point there are nine synthesizers that we work with, the Roland JX-3P is one of them. In fact, we just did *Koyaanisqatsi* live and I ended up playing the Roland, using it for all the bass and tuba parts, though these were originally symphonic ideas. When we recorded it, I used real basses and real tubas but doubled them up with synthesizer.

I feel that a lot of emotional content of sound has to do with the fact that it reminds us of an acoustical instrument. We can, of course, make any sound we imagine but, in fact, the sounds that are the most useful are the ones that remind us of trombones, oboes, french horns and so forth. Other sounds always sound like music from space movies or something. We tend to identify those sounds with nonhuman situations, like outer space—for the moment they're nonhuman, but that can change. The model of sound, for most people on the planet right now, is acoustic instruments, and we tend to hear those as familiar, friendly sounds. The ones that make a point of not sounding like acoustic instruments—but rather some imaginary, abstract sound—compositionally come with so many other kinds of associations.

Do you compose at a synthesizer?

Glass: No, I don't work that way. I have a Baldwin upright at home. About half the time I compose away from it because the stuff I do doesn't really fit on a piano, so it's not that useful. In other words, you can't sit down with a score like *Akhnaten* and play it on the piano. You've got to have four hands to do it. Most of the music is too contrapuntal to be played on the piano. However, I like to play music in real time, so I will often play fragments of a piece, not the whole score, because I like to get a sense of the time of a piece. I use the piano very much for that. I have great difficulty imagining a piece in real time in my head, so I find the most useful way to do that is to play it on the piano.

Most of my work is done at a desk, but I use the piano too. I don't do any overdubbing for composing at all. I write the music, then come down to the studio, and Michael [Riesman] and Kurt [Munkacs] record it. We always do a scratch tape before we do something final, to figure out how we'll approach the piece vis-a-vis acoustic instruments and synthesizers. We start from a completely composed score, there's no improvising done in the studio at all. There are virtually no changes. We first make a demo track so we can analyze the music and decide what real instruments we want. It has to do with economics—how many people we can hire.

Do you feel that you write differently for electronic instruments than if you are writing strictly for acoustic instruments?

Glass: Absolutely. For example, there's a lot of harp in the *Mishima* score that we just recorded, which is actually synthesizer, but would be very hard to play on harp. Someone who really knows harp playing well upon listening to it might realize that it can't be a real harp. There are things that can't be done on the instrument. But so few people would know that it doesn't matter, and what if they did know?

Because of the technology, you can put the music before instrumental technique.

Glass: Absolutely. When I can, I write for real double bass, and I double it with a synthesizer bass. There are times when I'll write something that a double bass can't play, but I know it can be played on a synthesizer.

[To Michael Riesman]
Do you program the sounds for the Ensemble?

Riesman: Yes, I do all the programming for the group. We recently did a live performance of the soundtrack to *Koyaanisqatsi* at Avery Fisher Hall, and that was a big programming job. I was doing string sounds, horn sounds, and imitations of other synthesizers that were on the original track. Plus we used six real brass, two trumpets, two horns, two trombones, and eight singers. But we didn't use any live strings, and the six brass players were about half of what we needed to cover all the parts. We used four keyboard players—I didn't play, I just conducted. That was a major programming job. I must have done some fifty programs for all the synthesizers, which included a Roland JX-3P and Juno-106 among others.

When you program sounds do you go for imitations of acoustic sounds?

Riesman: Not always, no. The bass sounds that we use in live performance with the Ensemble and on many of the records is definitely a synthesizer sound, the running bass notes. We used to use an Arp Explorer, which had a great bass sound because you could have it operating in four octaves at the same time. You'd get a very rich sound that way. We just recently replaced that with the Juno-106, and it of course has the advantage of having a memory which the Arp didn't have. In concerts I used to have to set all the parameters on the Arp for each piece, which was sort of a nuisance. Now we've bypassed that.

Do you use MIDI on stage or in the studio?

Riesman: We use it all the time in the studio. We haven't yet used it on stage, although we're getting around to it. I think we probably will, ultimately. It adds another complication to stage work when you're changing programs, and we just haven't geared up to it yet. In the studio, for example we're working on a new record right now and we have all of our MIDI keyboards—seven or eight of them—chained together. We're using them to get one

sound at a time. We have them all do strings, and play one line at a time.

Munkacsi: It works very well. We don't record any synthesizers without MIDI anymore. Every time Michael hits a key on a synthesizer, it's six or seven of them playing. It allows for more complex sounds. We get better bass sounds, a better trumpet sound. The possibilities are so much better. If you have a sound that needs to be a little brighter, you just go over to one keyboard, open up the filter and add it into the mix a little more. You don't really change your basic sound, it's still very much intact. And we generally premix down onto one track, so a track has a part not a sound.

Is your recording more along the lines of the way a rock album is produced, with a lot of multi-tracking?

Munkacsi: Yes, a lot of multi-tracking, punching in, and punching out. And we go in a lot for combining real instruments and synthesizers together to make a sound that's neither acoustic nor electric. A good example is on the *Photographer* record. We were recording a bass trombone. We got that on the tape and it sounded very nice. But then we went back and added a bass synthesizer along with it, very subtly, and that put in a bottom octave that is not normally on a bass trombone, so it sounded like a really massive bass trombone. When you combine real instruments and synthesizers you get a sound that's something other than real. It's not acoustic, it's not electric—that's what we like to go for.

Glass: The sounds are very complex. There is almost no sound which is what you think it is. When you think you're hearing trombones, you're really hearing trombones and synthesizers. You're rarely hearing a sound that is identifiable as a simple sound. Very often it's just an illusion.

[To Munkacsi]

What is your role as producer of the albums, the concert tours—essentially all of Glass's output? At what point do you get involved in the process?

Munkacsi: What usually happens is Philip writes something and before we record it, I'll go over to his house and he'll play it for me on the piano. I listen to the parts and melodies, then we go into the studio. When we start recording, as I hear things, we change things. We very often will change the octave an instrument is written in, or change an instrument from one sound to another sound. It goes from the very beginning, as we're putting it together we're orchestrating the music. Philip writes it all out and gives it to us as sheet music. From there we start recording the parts.

Do you make a lot of decisions in terms of the sounds, the programming?

Munkacsi: Yes, all the time while we're recording them. All the time we change everything. Philip is more than willing to experiment. He realizes that his first written score is just his first blocking of it, and how it comes out in

the end is a long way off. As a perfect example, we're doing a record now called *Liquid Days* for CBS. It's the one Philip is doing with Laurie Anderson, David Byrne, Paul Simon, and Suzanne Vega. Philip has written the music and each of the others has contributed a set of lyrics. We're blocking it all out on synthesizers first. We listen to it, and then go back and change the sounds, the orchestration, until we like it.

How long does it usually take to record an album?

Munkacsi: If it's a one-disk album, I'd say about a month, more or less. It takes about the same time a pop album takes. *Satyagraha*—the big three-record opera that will be out in July on CBS—we worked on that over the course of about seven months. We were actually recording for three out of the seven months, and that was with a cast of thousands playing and singing on it. We recorded it at RCA in New York, in their huge room, studio A.

It was very interesting how we approached that project. We got Christopher King, the conductor who had conducted it live, in the studio with a pianist. He conducted the pianist, and we recorded the pianist playing the whole opera all the way through, so we got all of Christopher's dynamics and tempos. Then we took all of Christopher's dynamics and tempos—this is going to be very controversial—and we made a click track out of them for the whole opera. With that on one track of the multi-track, we went back and put down a synthesizer guide track, which was basically a reduction of the piano vocal score on a synthesizer. Then we put down a vocal cue track so we could listen to the tape and know where we were. Then we took the New York City Opera orchestra and we broke them up into low strings, high strings, and woodwinds. We brought in the high strings first, and we put them in this big beautiful room at RCA with a Neumann stereo microphone. Generally we record all the acoustic stuff in stereo. We went through the opera, and the strings played their parts. Because we had all the dynamics worked out it was very easy—you know, play louder here, play softer here. Then we went back and did the same process with the low strings filling in their parts, then the winds, then the chorus, and then soloist. We did it all, but we broke it up into sections. What we got was a really good performance from everybody, but under optimum recording conditions. With all the arpeggios in Philip's music, if someone in a mass of forty or fifty people is playing it wrong, it's really hard to catch it in time. But when you go back and listen to it later you really hear it. With small groups of musicians you can get a really good, precise performance from everybody. Because it's a small group of people and you can concentrate on them. For the last step, wherever we felt the real instruments were lacking, or if we weren't really satisfied with the sound, we went back and dumped on synthesizers.

Where would you like to see electronic music technology go, what would be on your wish list?

Riesman: I would like to find a digital recording technique that doesn't use tape—essentially a sequencer that

you could record on by playing notes. These things exist already. I've tried the Sequential Circuits and Music Data sequencers, both using a Commodore. I don't think either of them are satisfactory for what I would like to do, in terms of inaccuracies of reproduction for one thing, and the difficulties of doing punch-ins and punch-outs. To get that happening to the point where it's just like dealing with a multi-track tape machine, that's on my wish list. Also, of course, to be able to do music printouts.

Munkacsi: In other words, to do away with the multi-track machine and really have everything controlled on a central computer driving all the keyboards. Then use the multi-track tape machine with your real sounds on it as a piece of out-board gear that the computer is controlling via SMPTE time code. Basically I'd like a computer-based operation and not a tape-machine based operation. Many of the programs I've seen are still awkward to use when you're editing, but it is getting better and better.

Do you see computers influencing the music composition process?

Munkacsi: Oh yes, I see it happening more and more. It's like writers that write with word processors. They couldn't even think about writing without one anymore. The same thing will happen to composers very shortly. They will be entering music data into the computer, editing it, and trying out all the parts before it ever gets to an orchestra.

[To Glass]

Do you feel comfortable on stage?

Glass: Oh yeah, I love it. I love the situation of playing music before people. I think that completes the creative cycle of having a musical idea, of writing it, rehearsing it, and playing it. To me it's a total, complete cycle, when I am there playing the music for the people. 



The owner of a large state-of-the-art recording studio in the middle of Times Square, operating on the cutting edge of the hit parade.

An independent producer-engineer with a music room in his suburban home and a track record based around young bands and youthful energy.

A novice producer-engineer, working from a small apartment overlooking the Peppermint Lounge in New York, learning as much from the "kids" who patronize his modest demo studio as he in turn is able to teach them.

What do these three share in common? Answer: The innovative world of MIDI and the computer, a revolution in sound that makes available a wealth of new textures and technologies even as it brings these advances within economic and conceptual reach of every musician, be they sophisticated professional or just starting out. As you read the three viewpoints that follow, you'll note the same catch-words: flexibility, efficiency, infinite possibilities of audio combinations.

That's because they're all true.

In studio B at Unique Recording, producer Arthur Baker sits behind a console working the Nona Hendryx. He cut the groundbreaking "Planet Rock" featuring a drum machine known around Unique as the "Ultimate Cheese," the Roland TR-808. He laughs about this with owner Bobby Nathan, who is giving me a guided tour around a complex that has gained the reputation as New York's hippest electronic facility, no small feat in a city that prides itself on being one step ahead of the times.

Unique originally began as a band name for Bobby and his wife, Joanne. Working musicians, they traveled with a multi-keyboard set-up that came in handy when they decided to open a rehearsal studio in 1979. "Back then," says Bobby, "if you had a Fender Rhodes, or maybe a Yamaha, that was really something." Unique, however, was stocked with seven or eight different keyboard synthesizers, and as they expanded to an eight-track studio, and later a twenty four-track, they kept the tradition up.

Now, with the construction of an upstairs "MIDI City," Bobby and Joanne show no signs of resting on their laurels. Conceived for the electronic keyboard musician, it centers around a pre-production room that will soon be stocked with every imaginable synthesizer, sequencer, and drum machine; and a similarly equipped control room. "The real advantage is that this is a lower-priced room for us," says Bobby. "We're already considered a relatively inexpensive sound studio, and now we can offer an even more favorable rate because we don't have to invest in heavy soundproofing. Also, the control room is designed with space in mind. Musicians today don't want to work with headphones anymore, and they like to work in the control room, to hear the mix just as the engineer and producer hear it. Now the studio *is* the control room."

3 on THREE

by Lenny Kaye

The key to all this is MIDI. Far from being amazed at how fast this all-important missing link has been, connecting a variety of synthesizer-computer interactions, Bobby wonders why it's taken so long. "A lot of people don't take sequencers seriously enough. The drum machine has found its place in today's electronic music, and everybody, whether they're an electronic artist or not, can deal with a drum machine. But people are slow to deal with sequencers, and that's sad because they are truly the final key in pre-production. If you use the sequencer properly, all the time that you spend on your demo isn't lost. When you go into a larger studio, you're not having to recapture a performance again. You can keep the same groove that got you the record deal in the first place, even as you're using a place like Unique to enhance your final sound with our greater track capability and outboard equipment.

"As MIDI has evolved, it's really made life easier for us. With overdubbing, a guy doubling acoustic piano with a Rhodes would have to exactly mirror-image the part and the performance. Today, with MIDI, anybody can do a part, lay it down and have that particular take synced up on separate tracks in one pass.

"If you can save time anywhere down the line, it's going to help you. The better prepared you are, the more profitably you can spend your studio hours. And you're not locked into anything: If the keyboard part on the chorus sounds wrong, you can go home and work on it at your leisure. In terms of dollars and cents, this doesn't hurt studios either. What you save on drum and keyboard tracks, you can put into other areas of your album: vocals, mix time, whatever. It evens out. What MIDI does is help people make better-sounding records, without the burden of an overly monstrous budget."

For Bobby, one of the best innovations has been the micro-computer's role in helping to organize this sudden burst of binary information. "When you buy a drum machine, you're basically buying a computer. If you buy an IBM personal computer, it will not only provide you with word processing, a database, and balance your checkbook, but it can also be a sequencer, or many sequencers. The initial investment is a lot less than buying five or six different stand-alone sequencers, and for the musician or composer, there are invaluable benefits. Being a guitar player, I never learned how to read music. There's nothing more frustrating than working with horn players who won't play what you show them because they can't read it. Using the GR-700 for a guitarist, or any MIDI keyboard, anyone can play a riff, have it printed out on music paper, and transpose it to any key."

Unique is utilizing both Roland software systems: MUSE (MIDI Users Sequencer/Editor) for the Apple and Commodore, authored by Jeffrey Rona, and MPS (Music Processing System) for the IBM-PC by Kentyn Reynolds. "MUSE is one of the easiest programs to work with on the computer, since it can be



Record Producer Rob Freeman



operated with a joystick or paddles like a video game. You select whatever function you're interested in and push the button. I think of it as a computer version of Roland's MSQ-700, incorporating all the features of that sequencer with an expandable memory.

"MPS is more elaborate and powerful. You can dump stuff from your MSQ to it, rearrange it, and then bounce it back to your MSQ. Since the Song Mode on the MSQ requires bouncing tracks with different MIDI channels to one track, and then not being able to go in later to turn a track on or off, with MPS you can keep them all on the eight tracks. It also has a cut-and-paste feature, so you can take one bar out of a sixteen-bar phrase and put it anywhere, however many times you want. It's very much a composer's program, especially with its music printing capabilities."

Like everyone else, Bobby and the Unique staff are improvising new uses for MIDI as they go along. With virtually the entire Roland line at their fingertips, including the Jupiter-8 (with the MD-8 MIDI/DCB interface since it was designed before MIDI's advent), Junos 60 and 106, the MKS-80 Super Jupiter, and of course the new JX-8P and the former JX-3P, "we find that the general MIDI thing, instead of confusing people, inspires them to go beyond. A lot of people here play what we call MIDI roulette, where they'll get five synthesizers, dial up five patches, and get a sound that no one synthesizer, or even two synthesizers, could approach.

"One of the things we've been experimenting with is the use of MIDI sequencers interfaced directly to a tape machine in such a way that when an artist records a performance, his acoustic sound goes to the tape recorder and his MIDI performance to a sequencer. Then, come the mixdown, instead of just eq'ing that track, adding reverb or compression or whatever, the producer and the artist have the ability to bring up the synthesizers again, and change patches or even the entire instrumental direction if they like. It's the ultimate control for a producer and artist."

Rob Freeman has a wall full of records that bear his production and engineering credits. His resume is impressive—Blondie, Robert Gordon, the Ramones, the Go-Go's (he co-produced their double-platinum debut, *Beauty and the Beat*)—and yet he exudes a boyish enthusiasm and sense of adventure that allows him to approach each project as if it were his first. Having built a complete twenty-four track studio in the shell of an abandoned bank for a spacey natural ambience; recorded inside a forty-five foot semi-tractor trailer; and run a microphone snake a quarter mile to an indoor swimming pool, it's only natural that he looks on the coming of MIDI with some excitement.

"MIDI itself opens up sounds," he explains as his sixteen-month old daughter peek-a-boos around a corner table in his spacious Westchester house, "very much the way the original

digital delay did, or the original flanger, or even tape-slap way back when. It's almost like MIDI itself becomes an effect, a new dimension."

"For the first Blondie album," he adds, "Jimmy Destri was using a little Roland synthesizer. We didn't have a lot of instruments available, so we had to layer the keyboards to get our variety of sounds, stacking ideas just off this one little Roland. We took up a lot of tracks on the sixteen-track. It was just so cumbersome. He had to play the performance exactly the same way, or we had to go back and punch it in, and then we had to eat up all these tracks, and then bounce them down, and that took extra time. I remember thinking that there had to be an easier way to do this; then after a few years, along came MIDI."

Rob doesn't regard MIDI as merely a time-saver, however. "It also fires the imagination. To have a bunch of synthesizers at hand, each with their own characteristic strengths and weaknesses, you can just home in on the one that suits your needs. You're able to start fine tuning the different elements of the instruments through MIDI, and playing them down in one performance. It's just a wonderful thing."

Though familiar with all the different synthesizer makes and models through his studio work, Rob—a keyboard player himself—long postponed buying his own instrument because he never felt completely "right" about any one model. "It wasn't just the monetary investment, which is always a consideration. It was the sense of obsolescence, or faddishness, or that the particular choice might not be flexible enough."

But MIDI's popularity allowed him to throw caution to the winds. "It was as amazing to me as stacking up a bunch of outboard gear in the studio. You just line up the special equipment you like in relation to a specific project, and you have a custom studio. I didn't have to hesitate any longer, because I knew if I grew beyond that initial instrument, I could put it on the second rack and it would become a MIDI slave. It will never become obsolete."

Rob's eventual choice was Roland's JX-8P, because "it just covers all the bases." Looking to split the difference between digital precision and the warmth of analog, more "to express my own personal preference in music" than professional considerations, he liked the hybrid feel of digital-controlled oscillators while not forsaking the older analog programming features. He put the JX-8P into play on his latest project, Tim Moore's solo album for Elektra, using it both as MIDI controller and sound source in its own right. "It's instruments like this that are the pride and joy of the MIDI world, because they're so flexible. Roland packed an awful lot into the JX-8P, and I especially appreciate the velocity sensitive touch. It's also very easy to set sounds up: The read-out is like no other instrument out there."

As for computers, Rob owns a Macintosh, admitting to some frustration over waiting for music-oriented software to be

designed for Apple's most user-friendly machine. "Sometimes," he shrugs, "state-of-the-art technology gets a little ahead of itself." Still, he plans to take full advantage of computer advances in the studio.

"Now they're primarily being used as super-sequencers, and for that alone they're very good. I'd like to see programs that control sounds, and patch changes, as well as sequencing. Then you could just hook your instrument up to the computer and really go to town.

"I think it has the potential of really helping things flow more efficiently in the studio. People aren't going crazy with it yet, because it's so new, and there are compatibility problems with certain equipment and that sort of thing. For example, most people are not starting out their projects with SMPTE time code yet. I think in about six months to a year it will probably be a lot more commonplace, as opposed to the current use of a drum machine sync. Once people make that conversion, it'll open up the door to doing post-production sequencing. Now, if you don't have your stuff sequenced at the beginning of your project, it's a little difficult to get it in there without SMPTE."

As MIDI opens the door to sounds and flexibility, Rob feels it will influence performance as well. "The whole notion of doing pre-production with a computer outside valuable studio time, and then coming in and laying it down, so to speak, with the touch of a start button, is really a valuable tool. In the same way, sequenced parts in live performance will erase that constant worry new bands have of 'will we be able to reproduce this sound live?'"

Many might feel that this takes an element away from the spontaneity of live music, but Rob disagrees. "My whole approach to production, and music, I hope, will never forsake a lot of the 'old' values. I don't think a computer will ever perform music as well as a person. Sounds are important to me, but it's as easy to be unimaginative with sequenced keyboards as anything else. I love the technology, but I'll always consider it in the context of performance value. The essence of a record I'm making has to contain energy. A computer doesn't have energy; a computer will playback the energy you put into it.

"I'm sure the day will come when some of the performance nuances of a particular player can be programmed into the computer. But until then, the net result has to come from the gut. Human feel is still the heart of music."

"It seems that music has shifted away from the band concept as it was in the '50s and '60s, and it's going into a producer-songwriter direction," says Dana Beaton, who works a regular job during the day so he can upgrade his studio—which takes up the better portion of his Fifth Avenue apartment—at night. Because of this, he has built what is essentially a demo environ-

ment, "helping people produce their stuff in exchange for just getting experience."

After three years of adding piece by painstaking piece, he's finally ready to begin in earnest. "There's still a lot of debt involved right here. I'm still grooming the room for rental." And though you might expect his high-rise neighbors to complain about the noise, he's only had one discouraging word in the past six months. "We had two guitarists jamming with their amps, and I can see how that might've carried." Soundproofing is next on his list of priorities.

The central focus of Dana's assortment of synthesizers and tape machines is his IBM-PC, which he borrowed from his parents who weren't using it. "All these synthesizers are MIDI'd together, and we're basically using the computer as a sequencer, the multi-track aspect of it, using Roland's MIDI Music Recorder software. It's made the compositional process more direct, because if you have an idea and get it sounding right once, you don't have to go back and replay that part later on when you have the song fleshed out. You move it around, you edit it, you shift a few bars here and there. Plus, from a songwriter's point of view, if the singer comes over and it's a half-step outside of his or her range, you just press a button and it's instantly transposed.

"It's these little things that often make the difference. After you go through several takes, and several demos, and you finally do get to a multi-track studio, the song has lost all the edge it had originally. The main thing is to get it right once and be able to keep it. No matter how many changes you make to the song, and how many revisions it goes through, those sparkling first takes are always there."

Dana feels that MIDI can benefit the small studio owner even more than the larger, because "it allows you to build your system systematically rather than watch it become outmoded. Plus it makes the whole thing more accessible on a musical level. You don't need any engineering genius to work with MIDI. You don't need to know signal-to-noise ratios, there's nothing to align or adjust. Just pop it in and it goes. The technology is getting very friendly. That's not to say that there aren't fine points to working with sequencers and synthesizers, but on a grass roots level you don't have to hear millisecond delays and lags in different tasks. You just have to make the music."

Along with sequencing, Dana sees the importance of the computer as a diagnostic tool, a fact brought home to him when two friends who are starting a studio worked out "a very sophisticated program to run a bunch of common calculations that an acoustician would do, measuring space and resonances, and where the problem spots might be. They had a list of fifteen different materials—wood, paneling, dry wall, glass, whatever—and they described the room as it is and how they'd like it to be. And the computer told them how much to use and where to





Demo Producer Dana Beaton

locate the materials.

"The computer is stepping in to give the little people some insight into any given situation. There's software out there that allows the computer to give frequency response measurements, calibrate the tape machine, even help set up the session. I soon hope to have one computer to do the sequencing, and another to program the synthesizers, to graphically depict the sound."

This concern for the "little people" doesn't just extend to Dana's own place on the music business spectrum. He has a genuine respect for those just getting their careers underway, and wants to help out in any manner he can.

"I'm not a musicologist, but I think things like MIDI are going to bring the concept of making music a little closer to home. Music has gone through some periods recently where it's been much more tightly controlled by the elite of music, the big money stars, and of course the record companies. There's a kid who I'm working with now on a song who is a messenger where I work. He doesn't know A to Z from multi-track technology, MIDI, or anything. He's just got talent, and he wants to do a song. He comes here, and it's like watching a hungry person go at a smorgasbord. You punch a few buttons, show him what can be done, and all of a sudden he's racing around, building up percussion tracks. I just kind of stay one step ahead of him and turn everything on.

"It's incredible to see that happen and that's what I'm doing here. If I have a song, I might not want to spend thousands of dollars on a demo, or go to a 16-track for \$35 an hour to be handed a microphone, or drag all my equipment back and forth. What can I do? Out of frustration, I recognized there's a need for a place a kid can go with fifty bucks in his pocket and get a song out of it real quick. If you know what you want, with MIDI, the computer, compatible electronic instruments, the song builds up remarkably fast. In four hours, he can leave with a cassette and play it for his friends in the neighborhood. It may not be master quality, but it's there.

"It's fun to see a kid who's never had access to all this equipment begin to learn its possibilities for the first time. I kind of wish when I was really involved in being in a band a few years ago that there had been a place to go and do that."

Dana can even envision a time when recording studios might literally be linked up by computer, giving new meaning to the phrase "phone in your part." "If a studio has their PC hooked up to a modem and I have mine, I could send them the song files. Not in real time, of course, but it seems like it would be feasible. Given the propensity of Quincy Jones, and Michael Jackson, and all those big-league people to work all over the world anyhow, sooner or later someone is going to get the idea of 'Hey, let's get all these guys sitting down at the phone somewhere and jam!'"



Specializing in a range of peripherals for home computerists and professionals with presentation graphics and design applications.

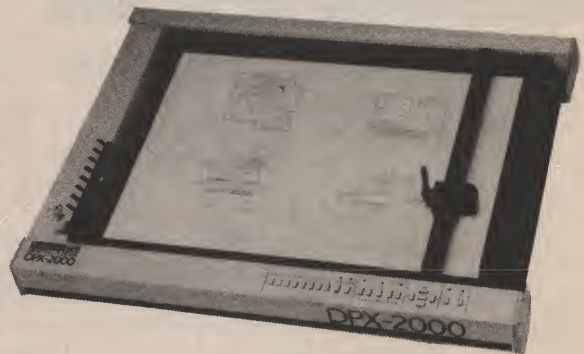
CD-240: Super Hi-Res Color Monitor

The CD-240 super high-resolution 12-inch monitor from Roland DG offers a resolution of 720 by 400 for superior text and graphics reproduction. The unit features a .31mm dot pitch, 25 MHz scan frequency, non-glare CRT, black matrix screen for sharp contrast and long persistence phosphor to prevent eye-straining flicker. The CD-240 is compatible with the Persyst "BOB" board, STB Super Res 400, and other high-resolution boards for the IBM-PC and compatibles. The retail price of the CD-240 monitor is \$799.



DPX-2000: Professional, Intelligent Plotter

Roland DG's DPX-2000 intelligent X-Y plotter offers professional drafting specifications for superior quality and performance. The DPX-2000 eight-pen plotter features many engineering-quality specifications such as serial and parallel interfaces, the ability to handle A(2), A(3), and A(4) (A, B, and C) paper sizes, 0.0125mm (1/2000 inch) resolution, 400mm (16 ips) plotting speed, automatic pen capping, electrostatic paper hold down, auto-sensor for pen type, multispeed digitizer, and a 3K buffer. With an optional stand the DPX-2000 can be used at an angle of up to 80 degrees for space saving. With a wall stand the



High Schoolers Plot a College Education

by Michael Ferris

"It's unusual for a company to introduce a new product and have it work, with no trouble, right from the start," says Peter Kendall, marketing manager for ROBO Systems (Newtown, PA). Kendall's company is currently bundling the DXY-880 plotter from Roland DG with their ROBO CAD drafting software and selling the package to school systems nationwide. "These plotters will work right out of the box," endorses Kendall. "We've never had a Roland go bad."

This statement of enthusiasm is the result of ROBO Systems' concentrated efforts to expand into the educational market with their CAD software, already a proven product in business circles. Exposing high school students to computer technology in the form of Computer Aided Design (CAD) in a curriculum area that has been traditionally viewed as vocational training—the "shop" classes—is a welcome development for college hopefuls who want alternative ways to accrue the required computer literacy credits that so many universities now expect from appli-

cants. So far ROBO Systems' efforts have been "a resounding success." The software is being accepted by educators—and so is the Roland plotter. "It does a respectable job in line quality and it's rugged enough to hold up in schools."

The DXY-800 eight-pen plotter is a breakthrough in features on several fronts, including HP-GL (Hewlett-Packard Graphics Language) emulation, making it compatible with hundreds of business and CAD/CAM graphics packages on the market today. And not only can the 880 plot on standard 8½ by 11-inch or 17-inch paper or acetate, but it will also accept non-standard sizes even as small as a postage stamp! The unit will sit on a table or at a 60-degree angle using the built-in stand, and it can accept a refillable Rapidograph technical pen, which is a solid professional feature. The plotter also includes a serial and a parallel interface, multi-speed digitizer, 3K buffer, 24K ROM, a resolution of .05mm, a 200mm per-second speed, and a selection of international character fonts.

ROBO Systems' drafting software comes in two packages, the ROBO CAD-1 and the ROBO CAD-2. Both

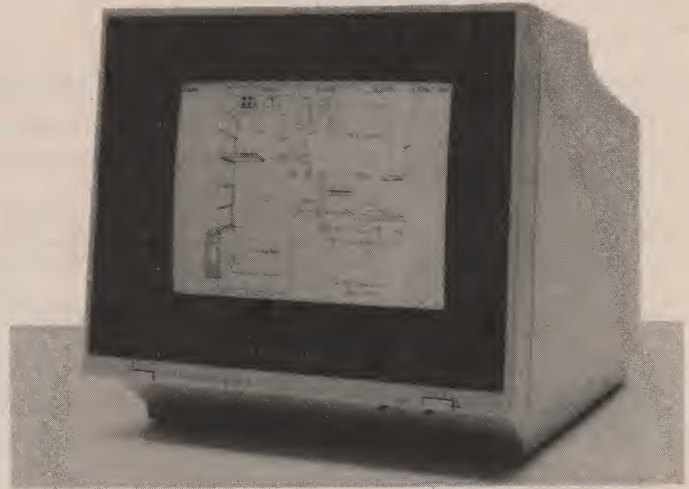
allow a user to draw straight lines, arcs, circles, crosshatches, and so on using a joystick for input to the screen. Color can also be added to a drawing and elements can be erased, repositioned and stored on a disk. The ROBO CAD-2 package features some extra enhancements like auto-dimensioning and numerical data entry for more technical work. Both packages currently run on the Apple II and IIE, although an IBM-PC version of both is due in September. The PC version will be able to accept input from a hand-held mouse.

The ROBO CADs are used by more than 8,000 customers, according to Kendall. Customers include such companies as Litton, Rockwell, and Honeywell. "We really have a cross section," he says. "It's capable of electronic design, digital-analog schematics, and printed circuitboard artwork. Artists like it too. You can draw anything with our system. Some users apply it to architectural drawing, space planning, and office layout. Engineers use it for mechanical drawings of assemblies, components, and parts. NASA uses it as part of the Space Shuttle program and the Ford Motor Company uses it to create schematics for little black boxes under the

DPX-2000 can even be used at a 90-degree angle. At a suggested retail price of \$4795 the DPX-2000 is a tremendous breakthrough in price, features, and software support.

MB-142: Black and White Monitor

The MB-142 TTL black and white monitor was designed by Roland DG to achieve an ultra high-resolution display from your personal computer. The MB-142's large 14-inch screen, combined with its ultra-high 720 by 350 resolution, can display characters that are large and more legible than what you can achieve with ordinary monochrome monitors. By using a special "paper white" phosphor, the MB-142 offers fatigue-free black-on-white viewing or white-on-black at the touch of a button. Another great plus is that the MB-142 plugs directly into the monochrome board of your IBM-PC or compatible—just like your present monochrome monitor, and with nothing more to buy. Because of the MB-142's advanced electronic circuitry, you have the ability to mix graphics and text on the same display when using graphic and text boards from such leading manufacturers as Persyst, STB, Paradise, Hercules, AST, and many others. The retail price of the MB-142 is \$375.



hood. There are even a lot of university art programs using it to create computer art."

Since ROBO Systems began their educational thrust a year ago, the two CAD packages and the 880 have been getting wide acceptance in schools. Atlanta's DeKalb county public school system has Rolands in fifteen different high schools. Kendall will soon be in Atlanta training industrial arts instructors on the CADs for use in the Fall curriculum.

In Atlanta, "the 880 won out over the rival Houston Instruments DMP-40 plotter originally specified by the school system. When the drafting instructor saw the 880 with its eight-pen capability and much better line quality for exactly the same price, his eyes popped out," says Kendall. They changed the order on the spot.

What schools typically do when teaching computerized drafting is have the students share one plotter at a workstation of three to four computers. The plotters are used to plot final, finished-quality artwork. After a series of dot-matrix printer dumps to get a quick run of the plot, the student goes to the plotter to plot the final piece of artwork that gets graded.

"An advantage of an eight-pen plotter in a school environment," explains Kendall, "is that teachers can leave it alone and let it do its thing. Instead of fooling around with pens, students can experiment automatically with changing layer colors or addressing different pen positions. Having to pause each time to change pens on a one-pen plotter breaks the continuity of the work and makes it hard for an instructor to get all the drawings plotted out in the time allowed.

"Designers use eight-pen plotters out in the real world," continues Kendall, and that's the main reason schools are adding computerized drafting to their curriculums.

"By and large," Kendall elaborates, "schools are still teaching the manual method of drafting using the drawing table, the triangle, the scales and so forth. But they're coming around to realizing that the industry uses computers to create designs and artwork as well as doing them manually.

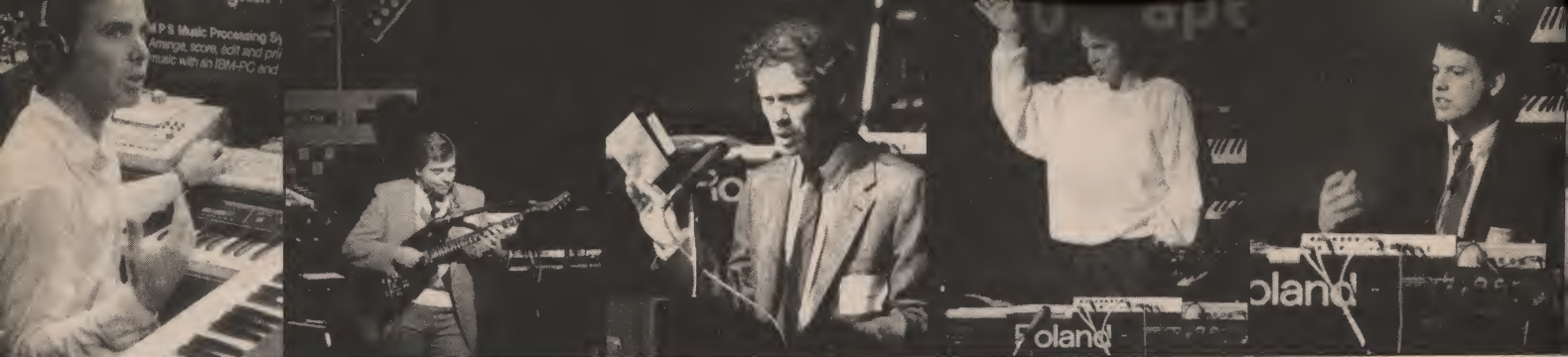
"Schools can teach all the areas where a student would encounter computers in the real world: mechanical drafting, architectural drawing, technical illustration, and so on. That bedrock of experience can be a springboard from high school to, say, an engineering program in college where

students can earn fancier titles like industrial designer."

Since focusing on the educational market, ROBO Systems has sold 250 to 300 schools on the joys of CAD and eight-pen plotting. "We have about as many schools now as our competition," says Kendall. One big break for the company is that most schools, unlike businesses, still use Apples. Another advantage is that ROBO Systems' two packages are faster and more powerful than their competition. In fact, "they're fast and fun to use."

"We always make presentations in schools," explains Kendall, and "usually after about a half hour of showing the artwork, a student or instructor can sit down to the program and get the feel of the joystick in about fifteen minutes. Soon they're drawing isometric cubes, sketches, and floor plans. The software is basic and straightforward to operate."

As a sidekick to the ROBO software, the 880 "is every bit as good as the Hewlett-Packard," the leading plotter in the field. "You can get a lot of nice things with it," says Kendall. "It's got good speed, top quality, and beautiful resolution." 



MPS Program Author Kentyn Reynolds

Product Specialist Mark Altekruze

Jim Mothersbaugh, Roland Service

Keynote Speaker Michael Boddicker

Product Specialist Eric Persing

Roland is committed to helping educate users at all levels to better understand the many new, creative music-making tools that today's rapidly changing technology makes available. The Roland Electronic Music Seminar was the first in a series of on-going educational programs designed to bridge the gap that has developed between this music-oriented technology and hands-on applications. Beginning in Atlanta and Seattle at the end of 1984, and continuing throughout March and April of this year to ten major cities, this eight-hour educational program reached out to enthusiastic users nationwide hungry for state-of-the-art information on recent advances in MIDI hardware and software applications.

Attendees, which included musicians, music educators, hobbyists, and music/video producers, learned the ins and outs of MIDI, what's available in MIDI music software, how to synchronize MIDI to SMPTE code for film/video scoring, in addition to a host of related topics. Opportunities for asking questions and getting answers from the experts were plentiful, and the lunch break provided the ideal time to freely exchange ideas and make new friends.

The program was divided into seven separate sessions. The first covered the most basic MIDI concepts, like how to build a song with a basic MIDI system consisting of a synthesizer, drum machine, and sequencer. Next more advanced system configurations were discussed, with the emphasis on using MIDI in live performance.

A presentation on the use of MIDI in the recording studio followed, with keynote speakers like Michael Boddicker (Grammy-award winning studio synthesizer

and composer), Suzanne Ciani (studio synthesist and composer of numerous television commercials), and Gary Wright ("Dream Weaver" synthesist, producer, and composer) sharing the "top secret" tricks they use to create hits.

The second half of the day was devoted to advanced MIDI techniques and the role the microcomputer plays in a MIDI music system, with demonstrations of Roland's newest sequencing/editing software: the *MUSE* program for Apples and Commodores and the *Music Processing System (MPS)* for IBM-PCs. The day's events culminated in a thorough discussion of the use of MIDI with various time code standards (such as SMPTE and FSK) and a live demonstration of music-to-video synchronization.

The success of the Electronic Music Seminar has prompted Roland to develop more workshops and hands-on training sessions slated for the not-too-distant future. Information on how to register for these events will appear in upcoming issues of Roland Users Group magazine.

If you were unable to attend the recent series of seminars in person, a textbook/audio tape package of the presentations is now available from Roland. The package includes a set of audio cassettes featuring tape-recorded versions of the seminar sessions, a volume of reference materials, plus taped audio demonstrations of Roland products—all packaged together in an attractive black nylon briefcase. The price for the entire package is \$49.95 and may be purchased by mail order using the form in this issue.

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Photos by Al Dugas

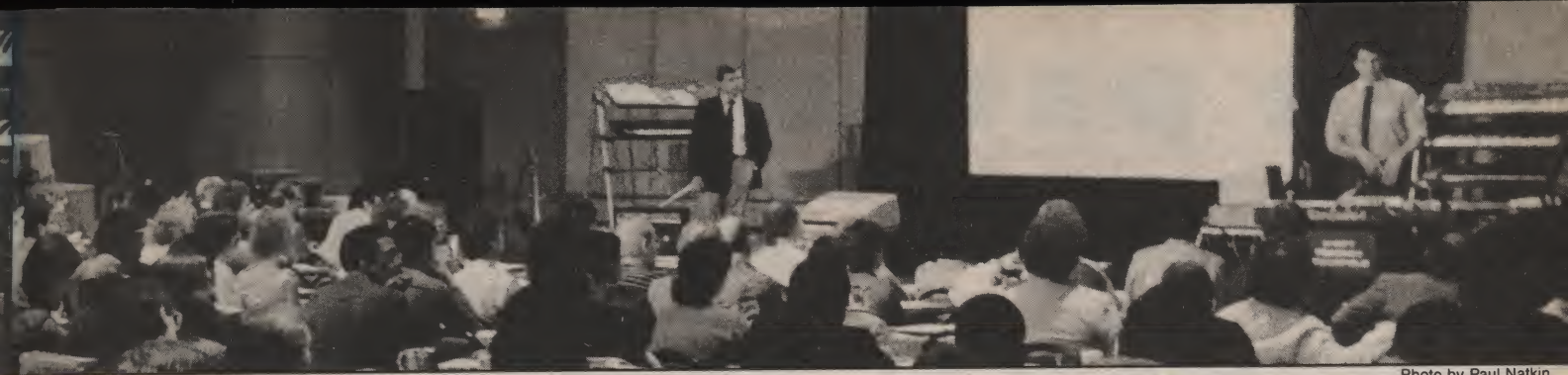


Photo by Paul Natkin

MIDI

"A wonderful seminar. All people were informative and entertaining. I give everyone an A-plus."

"I commend Roland for the implementation of this seminar and encourage any subsequent seminars. There is certainly a need for this highly specialized knowledge."

"This one day has done more to expand my view of what I can do with electronic music than any or all of the information I've had so far."

"The Seminar truly exceeded my expectations. I was very impressed with the knowledge of the technicians involved, as well as their musical quality and ability."

"Keep this up—it is immensely needed. I would attend each one possible."

"Great program! For those who've heard about MIDI but weren't sure what it was, this program really helped."

"Overall I think this was one of the best, well thought out, and most thoroughly explained seminars I've seen yet. Keep them coming!"

"Excellent! All the speakers were very coherent and well organized in a logical manner so that much information could be easily covered."

"The live demonstrations helped illustrate points while providing entertainment."

"The knowledge and communicative abilities of the presenters was very impressive."

"I came to the Seminar with a list of twenty questions. About 80 per cent of them were answered through the presentations, and the remaining 20 per cent were covered in the open discussions with the audience. The information was extremely accessible and the demonstrations were fantastic: I hope to attend future seminars."

"As a music educator basically unfamiliar with this technology, the Seminar met and exceeded my expectations. I have a much better understanding of MIDI in particular."

"The Seminar was well-planned, well-run, and far exceeded my expectations. Best point: Not too much Roland product hype, just good, interesting, useful information."

"I was impressed by the way presentations were given with an unbiased point of view toward Roland products."

"Excellent, lots of information. Each of the presenters was well-prepared and super friendly!"

"I was glad to see so much information presented that was applicable to other than Roland gear. The presentation by Michael Boddicker was especially informative because he discussed real-world problems, solutions, and techniques."



Takes MIDI to the Masses

tin pan alley cat

C O N T E M P O R A R Y K E Y B O A R D I S T N O R M A N M O N A T H

b y D a v i d H u n t e r

"In the past, if I got an inspiration in the middle of the night, I couldn't just run to the piano and play it, really, or try to memorize it. Now I just slip on the headphones and lay it down. I can make changes immediately and start to improve things. It saves time and increases productivity. It's just tremendous—the impact!"

Composer, performer, and music teacher, formerly a book publisher and editor, and the author of two books, Norman Monath is one of those talented individuals who never quits. Active in the music business for almost six decades, Monath has seen it all—the growing up of jazz, the birth of rock 'n' roll, the arrival of television, the heyday and then decline of the big Broadway show, the crazy '60s, and the synthetic '80s. When one realizes all that Monath has survived and adapted through the past forty-five years, during all the various phases of popular music, it's not surprising that he would be drawn to explore the newest music technology.

And gone exploring he has. Monath is a satisfied user of Roland's Piano Plus HP-400 with MIDI. As a tunesmith, he hammers out melodies on the piano and usually works with a lyricist. He is also a performer and a music teacher. For all three kinds of activities he says the Roland HP-400 is fantastic. This is high praise from a man with a prolific oeuvre dating back to the late '30s.

"Hal David and I were writing songs together, hanging around the Brill Building, and then World War II came along and separated us. When I came back I had to get a job. I couldn't afford to see what might happen through my song writing." So Monath sought out a position in the publishing business. At Simon and Schuster, he says, "I started at the bottom and worked my way up. Meanwhile I maintained my contact with Hal David through the years and with various people I knew in the music business.

"The first thing that happened is Simon and Schuster started Little Golden Records; Mitch Miller was in charge of it. I wrote a lot of children's songs for that—some with Hal David, for 'Captain Kangaroo,' 'Ding Dong School,' stuff like that." Monath also wrote songs with Walt Kelly for the Pogo cartoon on TV. During his long association with Simon and Schuster, he wrote several songs that were connected with books. Probably the most famous of these is "I Love Her, That's Why," which Monath wrote with Al Hoffman and Dick Manning. The song is the title of a book by George Burns and was sung by Burns on the '50s TV show he had with Gracie Allen.

"Then I became music editor at Simon and Schuster, in addition to my other duties," says Monath (one of the few editors whose job demanded a piano in the office). Through his contacts in the music biz, Monath brought to Simon and Schuster's line of music and lyric books the works of George and Ira Gershwin, Rogers and Hart, Rogers and Hammerstein, Noel Coward, Bacharach and David, Lerner and Lowe, Cole Porter, and Frank Lester.

Among Monath's own tune producing efforts are songs written for Dionne Warwick ("The Magic of Believing") and numerous collaborations, including songs with Evan Hunter and Sammy Kahn (who is currently working with Monath, as well as collaborating with Charles Strauss on an upcoming Broadway show called *Bo Jangles*). Monath says he's writing with several other people now that he's retired from the publishing business.

Monath was first introduced to the Roland Piano Plus HP-400 when visiting his son, a law student at the University of North Carolina in Chapel Hill. "He's a rock musician with an electric guitar," says Monath.

"And then he bought a drum machine. He took me to the music store where he bought that drum machine, and that's where I saw the Roland HP-400. I sat down and started playing, and the proprietor of the store came over to me and said, 'Hey, you want to hear what you just did?' Then he pressed a button and I almost fell over. Everything I played was repeated right back. Then he showed me the different things I was able to do. Needless to say, I bought one on the spot."

From time to time, before discovering the HP-400, Monath says he "fooled around" with electric keyboards. He knew someone who sold synthesizers, Yamahas, but the price seemed too high. So Monath went with Roland, which he says is in a class by itself. Not long after getting the basic instrument, he purchased the PR-800 Digital Piano Recorder and the PB-300 Rhythm Plus. Once he had the full MIDI system, Monath found that it had numerous uses.

"For writing songs it's fantastic," says Monath the composer. Typical of this soft-spoken, cultured New Yorker, Monath first mentions purely mechanical features, memory and repeating, that make his job as a composer easier.

"I like to write melodies. I can easily make a cassette for the lyric writer." Instead of the piano player grinding out the same tune over and over again, or the lyric writer playing and rewinding the cassette over and over, the Roland system will automatically repeat a melody in memory and record it on the tape. "I just play the part of the melody that I want repeated. Then I can sit down and relax. You don't have to roll back anything."

On a less laborious note, Monath also likes the freedom, when composing, to try different tempos without changing the pitch, particularly on rhythm songs. "It's a lot easier; you can do it immediately, and it doesn't make a soprano out of a bass." Monath finds this feature particularly useful in classical compositions, of which he has done several. He lays down a piece of music slowly, and with the Roland PR-800 increases the tempo automatically.

"If I want to compose a prelude, a very technical thing, I don't have to worry about sitting down and practicing it for hours so that I know what it sounds like in tempo—or getting somebody else to do it. I can sit down and play it like a baby and then just speed it up. And I can hear the effect.

"Another thing I can do in composing," Monath continues, "is lay down a bass and try different melodies against it. I can use different drumbeats until I get the proper feel. Or I can lay down a whole series of chords and start playing different melodies above it till I hit something that I really like."

For several reasons, Monath feels the memory features of the Roland are great. "What happens very often when you're composing and you're improvising is you do things and then you can't repeat them, because you can't remember. You know: 'Gee, I liked what I just did. But what the hell was it?' With an ordinary instrument you have to sit down and start writing manuscript yourself. And even the most abbreviated kind take time and effort. If you leave the memory function turned on you don't have to think about it. When you come up with something good you save it and play it back."



Right now, Monath describes the kind of music he is writing as "popular" and "top-40." He says he first started out years ago doing the type of ballads that "you would think of as a possible theme song for a movie. Nowadays, I'm more interested in doing the type of song that Lionel Richie sings. The kind of song where you get the hook immediately."

According to Monath, the top-40 crowd is not a captive audience like those for movies or Broadway shows. "You can write a song for that audience. But if you want to write top-40 stuff, where you want to get a crack at Kenny Rogers singing it, or Anne Murray, or Barry Manilow, it has to have an immediate impact." Needless to say, Monath uses the Roland to make "excellent demos."

There's no doubt about it, Monath is a wee bit cassette crazy. But as a sample tape in his collection shows, he's no slouch when it comes to playing different styles. On one side he has "The Sun and the Moon," a song he wrote with Sammy Kahn; then he has an original tune, "Caroline," that is followed by a blues bass against which he can improvise; and finally, he has the bass part of the Mozart G Minor Symphony. The last is "so I can play piano four-hand by myself," he says.

Above all, Monath likes to play piano, and the Roland HP-400 meets all his needs.

"Playing piano four-hands is a lot of fun," says Monath with obvious enthusiasm. "I like to play Beethoven, Mozart, some Schubert symphonies. I can lay down either part—the upper two hands or the lower two hands. And then I have that any time I want to use it. I just feed it into the machine. I play right above it, along with it."

As much as Monath plays purely for enjoyment, he also feels impelled to bring the wonders of piano music to as many people as he can. "For teaching," says Monath about the HP-400, "it is invaluable. The student can immediately hear through the playback exactly what he or she did."

Monath does not teach as much as he used to, but through his book *How To Play Popular Piano* he has brought the joy of piano music to many people. He uses the book as well as the HP-400 during lessons.

"You can make instant cassettes, one cassette to a pupil, which he brings to the lesson. You, as the teacher, can sit down and play on the cassette exactly how he should practice a certain part." Monath also uses the PR-800's metronome feature. "It really teaches you how to play in strict time," he says. The metronome is helpful when laying in drum beats to an existing composition. In teaching, Monath will have a student try to play in tempo with the metronome off. Then later he will add drumbeats so the student can hear how well the playing matched up.

Another great feature of his Roland system, says Monath, for both playing and teaching, is the headphones. Besides their "fantastic sound," Monath likes it that he can play anytime at night or in the morning and not have to worry about neighbors complaining. He can give a piano lesson whenever he wants or work with a fellow composer or lyricist on a song in the middle of the night. All it takes is two sets of headphones. "It sounds as if it is a whole philharmonic orchestra playing fortissimo. And your neighbor can still hear a pin drop."

Besides helping Monath with composing and teaching, the HP-400 helps him with his performing career, which nowadays consists of playing professional cocktail piano in nightclubs and hotels. For the past few years, Monath, like many a New Yorker, has headed south for the winter to sunnier spots in Florida, such as Palm Beach.

More a musician than a singer, Monath's main forte is medleys of well-known and original songs played on acoustic piano. "Now I'm going to try to do a little singing. I'm working up medleys and singing against them, increasing my repertoire."

At the moment, Monath does not feel the HP-400 is portable enough to take on the road. He'd just as soon "buy another one and keep it down there. I do intend to get a computer and

synthesizer so I can reproduce other kinds of instruments. For the moment, it's been fantastic with just these units." And since the HP-400 has standard MIDI jacks and complete channel assignability, it can be used as a controller with a microcomputer-based sequencing system.

As a tunesmith for many decades, and composing in many different styles during that time, Monath has had the opportunity to work with some of the premier lyricists of the musical era. Two of these are Sammy Kahn and Hal David.

"Sammy Kahn, all things being equal, likes you to play a melody for him. Melodies immediately spark ideas with him." So far, Kahn and Monath have collaborated on a dozen or so songs. The story of the first song they wrote together best illustrates Kahn's dynamic writing technique.

"I happened to be in his apartment, and he was shaving," Monath recalls. "He had heard me play piano only at parties. So he says he just had his piano tuned and would I try it, to see what I think of the tuning job. So I figured, since I wanted to write songs with Sammy Kahn, that I'd play an original tune. I get no more than ten seconds into the song and he popped his head out. He's only half-shaved, he's got a razor in his hand, and he says, 'What's that you're playing?'"

"'A tune I wrote.'"

"'Does it have a lyric? Would you like...'"

"I said, 'Sure!'"

"He says, 'Wait a minute.' It took him about thirty seconds to wipe off his face. Then he goes and sits by his typewriter. He takes a piece of paper and he puts it in the machine, and he says, 'Play that tune again.' He says, 'Okay, now I've got a title for it.' He says, 'Go ahead, play.' And now he types out the first line of the song. I play a little more, the second line. Almost as fast as I play is as fast as he completes the lyric. Now he finishes the thing; it took twenty minutes. Then he says he wants to 'neaten it up.' That's the way he works."

Monath, who co-wrote a number of songs with Kahn for the producers of *Sesame Street*, is amazed at how quickly ideas come to his colleague. "In most cases, he's told me he doesn't know how it's going to end. He says the song literally starts to take over and write itself and take him to the end. He's written some of his biggest hits that way." Kahn and Monath have several new songs completed that are soon to be recorded.

"I find lyrics very difficult to write when I've had to. I much prefer writing the melodies. Personally, I'd like somebody to hand me a lyric, and I would set it to music. That's how Hal David and I worked mostly. He would just hand me a lyric." According to Monath, David works both this way and how Kahn works. Monath sponsored the publication of David's songbook, *What the World Needs Now and Other Love Lyrics*, at Simon and Schuster. The book is divided up into three sections—music, lyrics, and the two combined. With the song "Alfie," says Monath, Hal handed the lyrics to Burt Bacharach. With "Raindrops Keep Falling On My Head," Bacharach had a tune first and then David wrote the words.

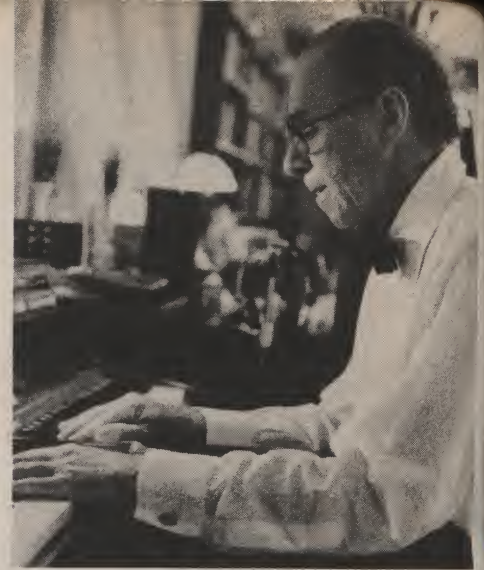
"Other songs," says Monath, "you go over line by line, measure by measure. Great lyric writers write any way they have to. If the title of a movie is *Three Coins in a Fountain*, you have no choice."

Monath is deservedly proud of his accomplishments in the publishing field. As music editor at Simon and Schuster he was responsible for bringing out the lyric books of some of the greats. "I became a book publisher but always had my interest in music."

Monath stayed with Simon and Schuster as an employee until 1959. Then he formed his own publishing company, Cornerstone Library, with Simon and Schuster as distributor. Monath has since sold the company to Simon and Schuster, and he retired from publishing in 1981. Since then he has written two books for the company he founded: *How to Play Popular Piano* and *Know What You Want and Get It*.

NORMAN MONATH

eat



Cornerstone Library specialized in "How To" non-fiction books. The person who did the promotion and publicity for the company was Terry Gaherty, who wrote *The Sensuous Woman*. Monath published another of Gaherty's books, *Golfer's Guide to Florida Courses*. During the course of his publishing career, Monath sponsored many books by the "golf greats and bridge greats." He also published such inspirational books as *The Magic of Believing* and *The Magic of Thinking Big*.

"Because I had published inspirational books, they asked me if I would continue 'The Magic Of...' series." So Monath wrote a book that was going to be called "The Magic of Wishing," but was eventually titled *Know What You Want and Get It*. "Then I was asked to write a book on playing popular piano songs." Including such standards as "Raindrops Keep Falling on My Head," "Moon River," and "Autumn Leaves." *How To Play Popular Piano* has been reprinted and is selling very well, Monath reports.

The ability to hear almost complete orchestrations with the help of a machine is part of the impact of the new music technology. In the past, says Monath, "It wasn't until you got into the studio with all the musicians that you'd find out something wasn't working."

How does Monath feel about the newfangled synthetic sounds becoming ever more popular? Are the old sounds disappearing? "The traditional sounds are all available. For the moment people are falling in love with other sounds. In the future, we'll have both." Back to Beethoven's Fifth Symphony trombones and earlier, there have always been artists breaking with tradition, says Monath. "Some of the sounds today are here to stay. Some won't have lasting value."

He goes on to mention that there have been many different kinds of string instruments besides the four commonly found in orchestras today. "When Bach was alive you might have had eight other options." These different instruments didn't last because their sound had no lasting value, or they had an awkward shape. But there was "no harm in their being around. The music written for those instruments is being played by other instruments. A lot of the music that is written for modern synthetic sounds will later be rerecorded with more traditional sounds." Monath likens the situation to the '60s, "when they were trying all kinds of crazy sounds. Every once in a while they'd write a good song. So now, when it's played on an easy-listening music station, it sounds nice. But it wouldn't have been written at all if they hadn't fooled around to begin with."

"It just expands our horizon to have new sounds available. I would have loved to have had the piano plus HP-400 in the house when my kids were young. I think a lot more people will become performers and composers instead of passive listeners. They'll be intrigued."

An exchange of hard facts, practical applications, and helpful tips for MIDI users.

by Freff

For most of us, most of the time, MIDI will be stone simple to use. All you have to do is keep some cables handy and remember five basic facts:

- 1) MIDI Out jacks transmit the MIDI data.
- 2) MIDI In jacks receive the MIDI data.
- 3) MIDI Thru jacks don't originate anything; they just duplicate and send back out whatever data is coming into an instrument's MIDI In.
- 4) There are sixteen channels to receive or send on.
- 5) MIDI can't make a synth do something it wasn't designed to do, any more than you can make an elephant fly by strapping it to a seagull.

That's all. (Putting together a component stereo system is tougher.) Just remember to plug the Outs or Thrus to the Ins, and to make certain that the receiving synths are set to the same channel that the master synth is sending data on, and you're set. Now you're MIDI'd. Ready and raring to go...most of the time.

Using MIDI is like driving a car. That's also easy to do once you learn a few basics: Get behind the wheel, step on the gas, steer, green means go, red means stop, press the brakes to slow down, and so on. You may never need to know anything more. But staying in your own neighborhood can get pretty dull. It's a big, exciting world out there, ripe for exploration. The farther you go, the more you have to know about the rules of the road and how your car actually works.

MIDI is just the same. It's standard enough, from one instrument to another, so that plugging a couple of synths together and playing both from one keyboard is easy. But if you want to tap MIDI's full power—a power that is growing at an astonishing rate as new hardware and software hits the market—you'll need to learn more. You'll have to look “under the hood” and see what's actu-

ally going on in there, and why it differs slightly from device to device. This time we'll just be laying the groundwork for you to get started.

Remember this: Like pretty much everything in this world, MIDI can get complicated in practice but it's not really complex in theory. Once you've got a grip in the fundamentals the rest will fall into place.

What Makes MIDI Possible?

That's easy. The answer is microprocessors.

A microprocessor is a very small computer, packed onto a single integrated circuit chip. Whether you know it or not, these little computers are a big part of your world. They are in calculators, TV sets, refrigerators, video games, cars, cuisinarts, anything at all where a little “intelligence” can be handy—there are even running shoes with built-in chips that analyze your jogging style and tell you how many calories you've burned!

You'll also find microprocessors at the heart of virtually every electronic musical instrument or device being made today. Why?

It comes down to the two things that all microprocessors share in common: the numbers 0 and 1. Those are the key. You see, microprocessors haven't got a gnat's scrap of real intelligence. They just do what they are designed to do, namely shove numbers around in a code called machine language. It's made up of 0s and 1s that have been clumped together into “words” of a specific length. 01001110 is a machine language word. So is 00000001. These are pretty incomprehensible to you and me, but to a microprocessor they are absolute, unyielding law as defined by the human beings who designed the chip in the first place.

At this stage, though, it's all just number pushing. The words don't yet *mean* anything, in the sense of doing useful work. That's where instrument designers and programmers enter the picture. Between them they physically connect the microprocessor to all the electronics of an instrument, assign meanings to the machine language words, and then write complex sets of instructions

that run everything. You don't need to know how this is done to understand what's happening. Your own body provides a convenient analogy.

Think of it this way: The microprocessor (your brain) is connected to an instrument (your body) by wires (your nerves), over which it monitors what's going on (your senses) and sends out appropriate commands. If you touch a hot stove your brain knows it and tells your hand to jerk away. In much the same way, when a key on a synthesizer is pressed the microprocessor knows it and starts the complicated process of creating an audible sound. Now let's extend the analogy to include MIDI.

No two people think alike, even though we all have roughly similar brains. And yet we can talk together and work together when we share a language. We can *communicate*. Similarly, no two types of instruments are programmed alike, but they can be made to work together if they are built to understand a common language.

MIDI is that language. It's what computer people call a “communications protocol,” a special way of linking different machines. In the case of MIDI a number of different things are covered by the protocol, including but not limited to what data should be sent, how it will be encoded, the rate of transmission, what kind of hardware would be used, and so forth.

This *doesn't* mean that MIDI synths understand each other's internal workings. They don't. But they can “talk” together because both speak MIDI, and each continually translates MIDI data into its own language, just as a Russian who doesn't speak French and a Frenchman who doesn't speak Russian can talk if they both know some third language, like English.

Why does something that's so simple seem complicated?

Never forget that microprocessors are computers, and computers are incredibly stupid. Fast, yes. They can process hundreds of thousands of instructions in a single sec-

ond. But smart? Not a chance. It takes hundreds of instructions to make them do something as simple as keeping track of which keys on a synth are down and which are up. That's a whole lot of 0s and 1s, and if any of them are out of place the whole house of cards can come tumbling down.

(The polite term for this is "bug." An inescapable fact of the computer age is that no complicated program is absolutely bug-free. The best you can hope is that any bugs are so obscure and unlikely that no one will ever run into them.)

Consider the many stages in the development of microprocessor-based musical instruments. With each stage, the difficulties increase. Every type of microprocessor comes from its manufacturer with a different set of built-in machine language commands. These are numerous and complicated. Then, in each instrument, these commands have to be integrated with totally different kinds of hardware and internal programming. Finally, they have to be programmed to translate MIDI data as best as possible. It's a massive juggling act, the equivalent of keeping thousands of balls in the air at the same time. What this means is that although MIDI is supposedly a standard, it is actually implemented in slightly different degrees by every manufacturer.

This is not ideal, but it is unavoidable. Like any human language, MIDI is full of colloquialisms. Each instrument speaks MIDI with a slightly wider or more limited "vocabulary." This is imposed by the realities of hardware design and costs, the time available for software development in a competitive market, the styles of individual programmers, and (sigh) bugs.

That's why the easy things to implement—like linking two synths to play simultaneously—is the best place to start finding out how MIDI really works. (See the Applications sidebar.) MIDI is a young language. And though it's really fairly simple, the fact is instrument designers and programmers haven't been speaking it for very long. They're still learning as they go.

Think about that for a moment, then consider how much has been accomplished, and in how short a time. Learning to speak MIDI is clearly a door to real power, and in the next issue MIDIFAX will help open that door for you. 

MIDI APPLICATIONS

The simplest use of MIDI is to connect two or more MIDI-compatible keyboards or synths together and play them all at the same time—same notes and same rhythms, but each playing different timbres. This can result in the development of some great sounds, and you can work musical miracles with this approach. But being able to mix and match lots of different sounds makes it important that you combine the *right* ones, not just any old ones that happen to be at hand. Otherwise, you might just end up with pure mush, which can be avoided with a little care and learning. To make the most of MIDI, you need to cultivate a new skill: Learn how to orchestrate. Of course one way to do this is to study music textbooks, but an even better way is to get some MIDI synths and start slamming timbres together for yourself. Your own ears will quickly tell you what works and what doesn't. Here are a few tips to get you started.

Mixing Similar Timbres. When they stand alone, most synthesized instrumental sounds often don't seem quite right. You know, the brass setting may become brittle as it rises in pitch, the "strings" lack definition in their lower range, or the lead line just doesn't quite cut it. Mixing similar timbres from different synths can be the cure. Many times one synth's version of a particular sound has strengths that make up for another synth's weaknesses.

The slow but thorough way to approach this is to look at what sounds you've got to choose from, organize them into general "families" (i.e. woodwinds, strings, spacy sounds) or specific instruments (i.e. flute, clavinet), and then start combining the sounds on one synth with related

sounds on another, pair by possible pair. If this pace doesn't suit you, be more deliberate: Figure out what's missing and fill the need. If you know you've got a great bass that just lacks twang, go find (or create) one that has plenty of twang but too little bottom, then mesh them together.

Mixing Different Timbres. Matching contrasting timbres is a ticket to whole new sounds, not just improvements on old ones. But what you can or can't get away with is really decided by other factors, like relative volume, relative pitch, equalization, stereo positioning, time offset, and the musical context you're working in. Playing in perfect simultaneity has a tendency to make sounds seem slightly forced and unnatural. Strive to avoid that. (For example, drumbeats doubling every single pitched note are a pain. They nail music into the ground instead of letting it fly on top of a rhythmic support).

Don't be too conservative. A general rule of thumb is that there's an area of diminishing returns that lies between combining similar and extremely dissimilar timbres—both within "families" and outside them. Quite often, the more separate the timbres the more powerful the resulting raw material. That's why you'll get newer and more interesting sounds out of most mixes of bassoon and flute (low double-reed and high breath) than you will out of bassoon and clarinet (medium single-reed).

Again, shorten your search by looking for complements—match buzzy timbres against smooth ones, steel against wood, hard pluck against rounded attack. For the time being, dump subtlety. Time enough to backtrack and explore that later, after you've charted the bounds of the territory.

Relative Volumes. In any successful collaboration, somebody's the boss. The same is true with MIDI'd timbres. Put them up at equal volumes and they'll

always stand a little apart. (You may want this effect sometimes, so don't forget the trick). But let one or another timbre clearly dominate, and suddenly you have a single sound that may or may not be like its separate parents. This works whether you are playing with similar or dissimilar timbres.

Using really low volumes—with sounds barely audible—can be extremely effective. At low volumes a timbre becomes a dash of spice and even lousy sounds can become good flavoring. The best digitally sampled string section in the world can be radically improved by adding a hint of cheap, buzzy, filtered square-wave string synth—no kidding.

Relative Pitches. You have four choices in establishing pitch relationships between separate MIDI instruments: unisons, octaves, intervals, and chords. Go easy on the chords and intervals. They won't leave a lot of room in your music because the note relationships won't shift as pitch does. Once a major seventh always a major seventh, even though the root will change. Unisons we've covered, but octaves—ah! Multiple octaves is a great way to build a really big sound. Try holding a nice widespread two-handed chord where every note is actually playing three different octaves of string synth and see if you don't agree.

It's also a nifty way to blend sounds that don't work together in the same register but have a timbral resemblance, like harpsichord and clavinet. Put them together in the same octave and you get mud; but push either one up or down an octave or two and the sound expands and meshes beautifully.

That Big Sound. Remember the beginning of Beethoven's Fifth Symphony? (Da-da-da-dum!) Sounds like a symphony hall crashing down on your head, right? In truth it's only the string section and two clarinets. The winning ticket is building the right *body* of sound and combining it with the right *spice*. Body you get by massing related sounds. Three or four synths set to similar patches, but detuned and filtered differently, will do that easily. The spice you add on top by contributing something that complements. Beethoven knew those clarinets would soften the edge of the strings without blunting their weight. Think in terms like that and you'll hit your target.

Time Games. Blending sounds with different attacks or different decays will let you build notes that change interestingly over time. Similar timbres will give you subtle changes that "animate" your music. Wildly different timbres are dramatic and theatrical (bang goes the piano as the slow strings fade up behind). Between the two extremes you can create sounds that start out as one timbre and change, smoothly and seamlessly, into another.

Focus on a Sound's Components. The time technique described above can be devoted to creating a Single Great Sound. Analyse a sound you want by breaking it down into separate aural components. For instance, the distinctive sound of a Fender Rhodes piano consists of a combination of the fundamental pitch and the high harmonic produced by striking the tye inside. Design each aural component of the sound on the synth best suited to produce it, then blend the components together in the right order of attack and relative volume. Hard work, but worth it when the tape rolls.

Space Games. That means stereo mixing, and you can use similar or dissimilar timbres here, it doesn't matter. Take advantage of MIDI's simultaneity and, when recording or performing, put each synth on a separate track, then go pan-pot crazy. Stand your timbres up in steady positions across the stereo spread like columns. Or weave them in and out like curtains waving in the wind. Or make them bounce back and forth like racketballs. Above all, have fun!

Hybrid Vigor. When trying any or all of these tips, remember that electronic keyboards fall into three basic categories: analog, digital, and samplers. Whenever possible, do your MIDI'ng across these lines. Their relative strengths and weaknesses are so well balanced you'd think it was planned.

Sampling can be gorgeously realistic, having more complex waveforms, but it's limited in bandwidth and has lessened presence. Analog has all the warmth and presence in the world, but less waveform complexity than acoustic sounds and a tendency to sound "thick" when multi-tracked. Digital is cold, clean, and cuts right through, but its high end is brittle and, on the whole, the sound lacks heart.

Can you see how well they might fit together? Use them! The best sounds you'll ever find will be blends of the best these different technologies have to offer.

We encourage you to share your thoughts with fellow users, to seek answers to questions, to offer solutions or helpful suggestions, to air your views and concerns. Write to Roland Users Group, 7200 Dominion Circle, Los Angeles, CA 90040.

AND THE BEAT GOES ON

by Dennis Kahle

Tracing the roots of contemporary rock rhythms is an elusive task at best. On the one hand, one is tempted to begin with 1954's "Sha-boom," arguably the first rock-'n'-roll record, and move forward from that point. While this approach has certain merits, notably a kind of ready-made genealogy pioneered and championed by various pop-oriented media, there exist some roadblocks in this version that are very tricky to negotiate. For example, how does one account for the shift from "shuffle" to "straight-eights" only a few years later? There certainly were no undercurrents in white American popular music that foreshadowed such a simple but influential change.

If, on the other hand, one forces so-called "rhythm and blues" into the mold of progenitor, what becomes of the early (circa 1973) efforts of groups like the Pointer Sisters? Are they to be taken as freak branches on the tree of rhythmic evolution?

Even using Latin music as some sort of source has its drawbacks when one considers that East Coast musicians were influenced by Puerto Ricans and West Coast players had their own set of Spanish-speaking countries adding spice to the mix.

With all these variables, you might well ask, "Why bother?" Yet, a little diligent foraging can yield unexpected rewards, especially as regards programming drum machines. At the very worst, your drum programs will sound more musical; at best, you'll increase your spontaneity tenfold by adding additional material to your vocabulary. You might find it beneficial to take a rhythm you particularly like and follow it through various stylistic changes (both the overall musical style and the style of individual drummers) until you arrive at the present.

A good case in point is the rhythm notated in Figure 1. This same rhythm in

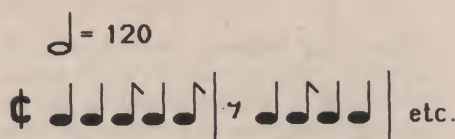


Fig. 1

slightly varied form can be found on page 48 of Alfred Publishing's *Drum Machine Rhythm Dictionary* by Sandy Feldstein. There it is given the name "mambo." The earliest examples that utilize this rhythm as a basis for a tune are found in recordings made by Xavier Cugat (*La Sierra*, Madrios label) and Tito Puente (*In New York*, A and P Distributing) about the mid-1940s. Especially interesting is how, in that "Latin-American" style, the bass worked with the treble and always pointed toward the "and" of the second beat. (See Figure 2.) To aid programming, the rhythm is recast in 4/4 time as in Figure 3.

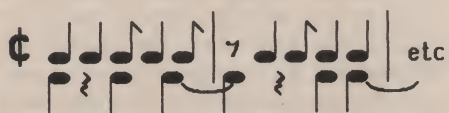


Fig. 2

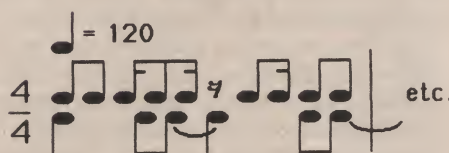


Fig. 3

Using step write, program your rhythm machine using either the cowbell or hand-claps for the treble part, and a very low tom-tom or conga with maximum decay for the bass part. If you're working with Roland's new TR-727 Rhythm Composer (Percussion Version), which is ideally suited for rhythms such as this, substitute

High Agogo for the cowbell (treble) and use Low Conga for the bass part. Load this bar into memory for at least sixteen repeats paying close attention to the feeling of “fuzziness” you get due to the lack of a strong downbeat. This seeming awkwardness is typical of Latin music but sounds a bit foreign to American ears. It was the American jazz drummers who pushed this rhythm into its next reincarnation during the late '50s, and almost any recording of Sonny Rollins' “St. Thomas” will illustrate the change, as noted in Figure 4. (See his album *St. Thomas* on

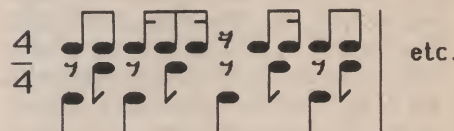


Fig. 4

the Blue Note label.) Merely by placing the bass on each beat, the foundation becomes rock solid and frees the treble to perform the improvisatory chores. Again using step write, program the rhythm in Figure 4 for sixteen bars, retaining Figure 3's treble orchestration, but changing the bass part to bass drum and closed hi-hat (simultaneously), and using alternating rim shots and middle (or high) tom-tom for the alto part.

Friend rhythm (some might say villain) returned again, calling itself “disco” in the early 1970’s with Dinah Washington’s “What a Difference a Day Makes.” As notated in Figure 5, the change—at least on

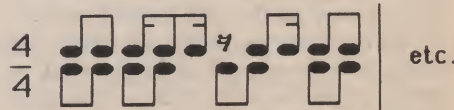


Fig. 5

paper—is slight, but the feeling of motion is altered completely. Even with the treble retained untouched, the addition of the constant eighth notes eliminates any implication of syncopation, and the rhythm assumes an almost martial character. What happened next in this rhythm's evolutionary process forms the basis for much of today's contemporary music.

One group of musicians—by far the largest—retained most of the disco elements, notably the steady quarter notes in the bass and the accented two and four in one of the inner voices. Most changes were usually in the treble part and alternated between using either steady eighth notes or the syncopated pattern, depending on the style of the moment. That this style is alive and well in 1985 is evidenced by listening to either Madonna's "Like a Virgin" on Sire records (steady eighths), or DeBarge's "Rhythm of the Night" on the Gordy label (syncopation).

Another group of players blended several disparate styles and began creating

fusion (crossover) material. The syncopation was not as unique to this genre as was the placement of notes over the trap set. Admittedly, steady eighth notes were played, as well as sixteenth notes, mostly on the closed hi-hat. However, the base rhythm alternated between the bass drum and snare drum, offering on one level a culmination of all that had come before, and on another level becoming a style unto itself. (It is my opinion that Mitch Mitchell with Jimi Hendrix did much to show the path.) Figure 6 offers a typical rendering of the rhythm in this style. In addition, in the *The Drum Machine Rhythm Dictionary* Sandy Feldstein has

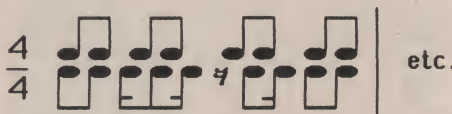


Fig. 6

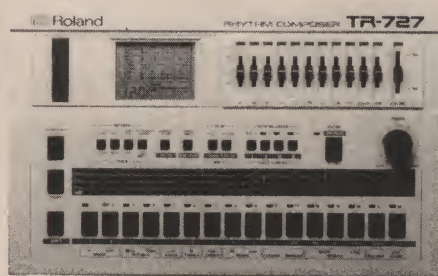
done an excellent job of presenting such rhythms as played by various well-known drummers. A good example of a contemporary treatment of the rhythm we've been discussing is by Dave Garabaldi, shown on pages 90 and 91.

When programming your own rhythms, the kind of historical exercise offered here will suggest new ways to treat repeats and can provide some interesting ways to move from section to section in a song. As an experiment, use "Rhythm of the Night" or a similar top-40 song. Sync your cassette player to your drum machine and program 4 bars each of Figures 3, 4, 5, and 6. Now play the rhythms back along with the cassette of the song and notice how each different version pushes the song into a different idiom with each change. Experiment with shifting examples from place to place and vary the base rhythms, each time noting the stylistic changes. This kind of experimentation can help your rhythm machine programming to become smoother and more natural and, as an added bonus, you'll have listened to some fascinating music. 

New TR-727 Rhythm Composer for Percussion

To create a Latin feel in your music or to bring some exciting sound variations to your programmed rhythms, the new TR-727 offers fifteen digitally recorded percussion sounds with all the same programming features, including MIDI, found in the popular TR-707 Rhythm Composer. Sounds include low and high bongo, high conga open and muted, low conga, low and high timbales, low and high agogo, cabasa, maracas, short and long whistle, quijada, and chimes.

All sounds have a high signal-to-noise ratio, a broad dynamic range, and are extremely clear and realistic. Individual level sliders are provided for each sound, and the volume balance between each sound can be easily adjusted and confirmed at a glance. An LCD (Liquid Crystal Display) graphic window gives precise information on the rhythms you program, as well as programming mode, track number, measure number, tempo, and MIDI channel. Each sound has its own audio output in addition to master stereo outputs, so they can be



individually processed by effects, reverb, delay, and EQ devices.

The TR-727 can store 64 rhythm patterns and rhythm chains of up to 999 measures (in four tracks). There is a tape interface for data storage on cassette, and an optional M-64C memory cartridge is available. The cartridge serves to double the instrument's immediately available pattern and track memory.

Two programming modes are available: in real-time mode program patterns by tapping the sound buttons the same way you play a drum; in single-step mode program one sound at a time, step-by-step. By connecting a

velocity-sensitive MIDI keyboard to the TR-727, all sounds can be dynamically controlled from the keyboard with 128 levels of loudness. Other sounds can be added too, by connecting it to any MIDI sound-producing unit.

The TR-727 has a Sync-24 jack to sync with another Sync-24 unit, and it outputs an agogo trigger signal to control other external devices. The Tape Sync function enables the TR-727 to be synced with a multi-track tape recorder. A headphone jack is provided for easy monitoring.

Compact and light weight, the TR-727 measures 15 by 3 by 9.8 inches and weighs 3.3 pounds. The suggested retail price of the unit is \$595.

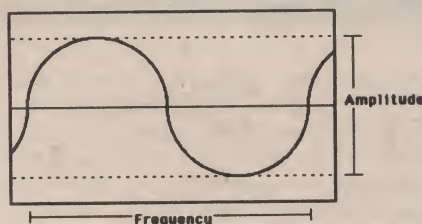
EFFECTS DEVICES: HOW THEY WORK AND WHAT THEY DO

by Alan diPerna

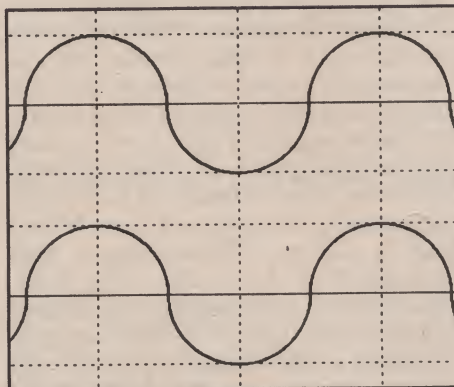
"Can't we put some kind of effect on this instrument to make it sound better?" As timeless questions of the music business go, this one ranks right up there with chestnuts like "Are you *sure* my name's on the guest list?" And like most perennial questions, this one has both a short-form and a long-form answer. The short-form answer is an easy one: Yes, there are very few instrumental or vocal passages that can't be enhanced by a thoughtfully applied effects device. But determining *which* effect is best in any given situation requires a unique blend of knowledge, experience, intuition, and taste. To help you in your choice of effects, we've assembled the following notes on some of the most common effects and their applications.

Phasing and Flanging

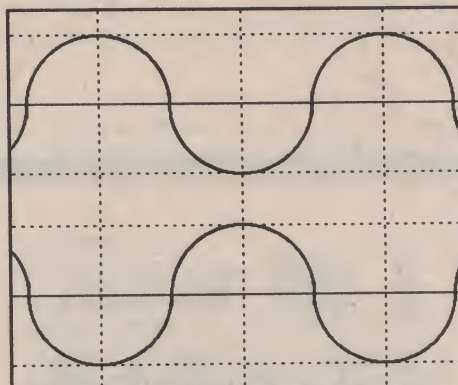
As its name implies, phasing is based on the principle of phase cancellation. Imagine two sine waves that are identical in their frequency and amplitude:



If the two waves are added together and each begins its cycle at precisely the same point—so that the two waves are at their lowest and highest points of amplitude at precisely that same time—they are in phase. If they are combined, they will form a wave with double the amplitude, and the resulting composite wave will be audibly louder than either wave by itself.



If, however, one wave is at its highest point of amplitude while the other is at its lowest, then they are said to be 180 degrees out of phase. If they are combined, they will cancel out one another completely and no sound will be audible.



If the two waves are any more or any less out of phase than 180 degrees, combining them will result in a partial cancellation. Certain frequencies will be emphasized and others will be de-emphasized.

The effect we now know as phasing was first discovered by engineers attempting to achieve a simple double effect by taking

two identical signals on tape and playing them back at slightly different speeds using two different tape machines. However, rather than a simple doubling of the signal, this technique creates a sound resembling that of a jet plane. The time differential between the two signals creates a variable comb filter—a composite waveform with sharp peaks and notches in frequency resulting from phase cancellation.

In their experiments with this early tape-based phasing, engineers developed the practice of varying tape speed by applying a little hand pressure to the flange of the tape reel. Hence the term flanging.

Present-day phase shifters and flangers work by electronically re-creating the phase cancellation characteristics originally achieved with varied tape speeds. A signal that enters the input of the device is split. One side is sent directly to an output mixer. The other is sent through a variable phase-shift network, which delays the signal, and then to the mixer. When the two signals are recombined at the output stage, phase cancellation produces a variable comb filter. The depth of the effect can be varied by changing the mixture of "dry" and "treated" signals. When the two are equal in level, you have maximum depth.

Flangers differ from phase shifters in that the frequency notches created by the phase cancellation are harmonically related, whereas those produced by phasing are evenly spaced over the frequency spectrum. Most flangers let you alter the harmonic content of the comb filter—by varying the delay time of the treated signal. Most also feature a regeneration control, which returns a portion of the delayed output signal back to the input, where it is delayed again. The effect that results is harmonically rich and dramatic.

For the above reasons, most players today prefer flangers over phase shifters for most applications.

"Flanging has more of a pronounced effect," according to noted session guitarist/producer Jeff Baxter. "It has a ripple effect; that is, it leaves ripples in the sound at the frequencies where you best hear them. A phaser will usually just sweep the frequencies in a clean manner; it does not cause any ripples. Also, for some reason, the mid-range frequencies seem to comb better on a flanger. I usually end up using a flanger more because, in many ways, it's a more obvious sound. Particularly if it's a movie or TV scoring call, you have a much better chance of having the effect be heard in the final mix if you use a flanger."

Echo and Delay

Echo, of course, is an effect that occurs naturally when sound waves bounce back and forth between two reflective surfaces under given acoustic conditions. As an electronically generated effect it was—like phasing and flanging—first created using a tape recorder. Any tape recorder with separate record and playback heads can be used to create a simple echo effect. An input signal is recorded and monitored off the record head while the recording is taking place. A few seconds (or milliseconds) later, when the portion of the tape bearing the recorded signal reaches the playback head, the signal is played back and heard for a second time—i.e., there is an echo. Multiple repeats are achieved by feeding part of the playback head output back to the record head. A resistor can be introduced into the line and used to determine the number of repeats. Popular tape-based echo devices—such as the Echoplex, Roland Space Echo and Chorus Echo—are based on the same principle. Multiple, movable playback heads and/or variable tape speeds are used to govern the time that will lapse between repeats. Although a good many echo effects today are generated by digital delays (as we'll discuss later), many players still prefer tape echo in some cases.

"For certain things, I'll invariably use tape echo," says keyboardist/synthesist Rich Gibbs. Formerly Oingo Boingo's

keyboard man and currently the leader of the group Zuma II, Gibbs is also an active L.A. session player whose recent credits include work with Dionne Warwicke, Matthew Wilder, Melissa Manchester, and soundtrack work for Brian DePalma's film, *Body Heat*. "For example," Gibbs continues, "if I'm using my Minimoog for a solo type of line and I want to beef it up, tape echo is a little bit warmer. The inaccuracy of it [i.e., the liability of magnetic tape moving over heads] is actually helpful. But if I'm doing a rhythmic part and want to have some kind of slap going, I find it's a lot better to use a digital delay."

Not so long ago, the use of digital delay lines (or DDLs) was confined to recording studios and high-end P.A. applications. The cost of these devices was prohibitive for many players, who instead got their delay effects from analog devices that were often noisier and less flexible than digital delays. In the last year or so, however, prices have come down dramatically and many players have been able to afford a high-quality digital delay, such as the Roland SDE-1000 or SDE-3000.

Basically, a digital delay begins its work by taking an analog input signal and converting it to a digital code (i.e., a series of numerical "bits" representing all the tonal parameters of the input signal). The digitized signal is fed into a device called a shift register. A high frequency oscillator sends clock pulses to the shift register, causing the digitized signal to repeat at the rate dictated by the clock pulses set by the user. The signal is reconverted to analog audio and sent out of the delay unit. There are generally separate outputs for the delayed signal and a dry signal (which passes through the unit unaffected), as well as a composite output, which passes a combination of dry and delayed signals in a proportion set by the user.

Most DDL units include a feedback control, which lets the user regulate the number of repeats and get some very interesting "overload" effects. There's usually a hold function also, which will repeat a given delay pattern continuously until the hold is released. As a rule, digital delays offer the dual advantage of precision and clean, quiet operation, compared with other types of delay devices.

Beyond this, DDLs can generate effects other than straightforward echo or delay—notably flanging and phasing, which, as mentioned, are essentially delay effects. Most digital delays let you add programmable modulation and phase inversion to the digitized, delayed signal. This makes possible some very convincing phasing and flanging effects. And as many of today's DDLs are equipped with four, five, or six presets (which memorize all front panel settings), many musicians have taken to presetting all of their favorite effects on one DDL, taking that on the road as their only effects device.

But many players still opt for a dedicated flanger for critical applications. "Delay lines do a good job of flanging," says Rich Gibbs, "but they don't get quite as deep in the frequencies, somehow, as a dedicated flanger. Live, however, I'll always use my DDL for flanging. I don't use the pedal because I want to keep my setup cleaner. I have one DDL and I just step between my preset programs."

Reverberation Effects

Reverb differs from delay-generated effects in one important way. While delay effects involve the discrete repetition of an input signal at different intervals, reverb involves repeating the signal at *irregular* intervals, simulating the sound you would hear if your signal were bouncing around the walls, floors, and ceiling of a room. Apart from actually pumping the signal into a room or a reverberation chamber and miking the results, reverb can be achieved by either mechanical means (spring or plate reverbs) or through the use of digital technology (digital reverbs and

room simulators). Since the mechanical devices predate digital reverb, let's look at them first.

Both spring and plate reverbs operate on the same basic principle. An electrical input signal is converted to a series of mechanical vibrations via a driver—not unlike the driver used in your speakers. But instead of transmitting these mechanical vibrations to the diaphragm of a loudspeaker, the driver in a reverb unit transmits the vibration to either a series of metal springs or to a metal or gold-foil plate. The vibrations of the physical medium—be it springs or a plate—are then sensed by a pickup device and reconverted into an electrical signal.

In both spring and plate reverb, the energy waves are received by the pickup device in fairly complex patterns. Plate reverb devices position the pickup off-center on a rectangular plate. This means that some of the plate's edges are closer to the pickup than others. Vibrations returning from the closer edges, naturally, reach the pickup sooner than vibrations from more remote edges. Spring reverbs pass some of the energy waves from spring to spring in a straight line. Some waves, however, are sent back to the starting point and make the entire trip from spring to spring over again. These waves naturally reach the pickup later than those waves that didn't have to go back to the starting point. In either case, the net effect is to reproduce what you hear if you were standing any place other than at the exact geometrical center of the room and listening to the input signal being played back in that room.

Digital reverb devices achieve the same results without resorting to mechanical means. As in a digital delay, the input signal is digitized and subjected to time delays. But unlike the regular clock pulses used in digital delays, digital reverbs subject the digitized signal to irregular pulses, which simulate the reverberant qualities of an actual physical space. On reverb devices such as the Roland SRV, it is

possible to "dial in" the reverberant characteristics of virtually any room, from the Royal Albert Hall to your broom closet.

Distortion and Compression

Whether you call them fuzztones or overdrive preamps, distortion devices are the start of nine out of ten basic guitar sounds. Ultimately, the goal of electronic distortion devices is to reproduce the characteristics of an overdriving tube amp, such as a 100-watt Marshall amp, at any volume level. Tube amp distortion characteristically creates a series of even-numbered harmonics, as opposed to the odd-numbered harmonics you get when you overdrive a solid state, or transistor amplifier.

Many distortion devices incorporate a built-in compressor, which keeps volume levels manageable. A compressor works by attenuating (cutting off) the amplitude (apparent loudness) of any input signal above a given level. As a result, the waveform necessary to produce the desired distortion effect is created, but the undesirable peaks of amplitude belonging to that wave are attenuated.

Personalizing Your Use of Effects

The key to using effects to create a sound that is distinctly your own lies in (1) finding unique applications for those effects and (2) combining multiple effects devices in a manner unique to you. Basically, this means listening carefully to the characteristics of each effect and determining what it can do for you.

"I always try to find some unusual way to use an effect," says Rich Gibbs. "One of my favorite tricks, which I used with Oingo Boingo on a song called 'Nothing to Fear,' was to run my Fender Rhodes electric piano through a BOSS CE-1 chorus pedal. I had a Fender Rhodes suitcase model, which has a separate preamp output. I'd take that, crank it all the way, run it into the BOSS chorus, crank *that* all the way, and then use the master volume on my mixer to control the overall level. All of a sudden, the chorus ensemble became a fuzztone. I'd just drive it to the point where it was real nasty—better than any

fuzztone. You would have all this distortion going on, *plus* all the chorusing the unit was designed to produce. A lot of people think it's a guitar on that track, but really it's a Rhodes through a BOSS chorus.

"As a rule, I tend to ignore the specs on an effects device—unless I'm going for total cleanness—and try to look for the personality in each one."

As for combining multiple effects devices, you have a great deal of flexibility as to where you place each device in your signal path. As a general rule, though, many players tend to start with distortion and end up with echo or delay.

"I always put the distortion first in line," explains Jeff Baxter, "to make it almost a part of the guitar sound itself. If you wanted to use a compressor, you would probably put it somewhere between the distortion and the chorus (if you were using one). The chorus makes a little bit of noise on its own, and I think it just sounds a little more natural if you cut down on the signal *behind* the chorus. It calls less attention to the working of the compressor."

"If I have any echo or delay going, I'll always put that last in line," adds Rich Gibbs. "If I have any distortion happening, I want to echo the distortion, rather than distorting the echo. If you do distort the echo, things start to get a little murky."

But who knows? Your own experience might be different.

"Don't be afraid to experiment," Jeff Baxter advises. "You're not going to break anything by changing the sequence of your effects devices; and they all react differently. If you put the compressor in front of the flanger, as opposed to behind it, it's going to react differently. So don't be afraid to move things around. Nothing bad is going to happen."

In fact, you might just end up with the exact sound you've been searching for!





GR

ONE STEP BEYOND...

One of the great ironies in the development of electronic musical instruments is the fact that the early front-runner, the electric guitar, hasn't kept up with the electronic keyboard. While guitars were first electrified in the 1930s, it wasn't until very recently that guitarists have been able to take full advantage of the new technologies that keyboard players benefit from.

Some people feel that the first major advance in the evolution of the electric guitar was the use of the high-gain audio amplifier and solid-body electric guitar. Pioneers like Jimi Hendrix, Eric Clapton, Jeff Beck, and Jimmy Page used this combination to produce that smooth sustaining legato sound that sounded so new in the late '60s and early '70s. While the use of high-gain

by *PETER MENGAZIOL*

clipping amplifiers extended the vocabulary of the electric guitar by introducing "electronic" elements such as distortion, sustain via "acoustic recirculation" through the physical guitar strings, and new harmonic overtones via feedback, the development of the microprocessor-controlled keyboard synthesizer years later overshadowed these simple yet very effective guitar idioms.

When you contrast the kind of equipment being sold at guitar counters to the gear sold in the keyboard department, an immediate technological gap appears: The guitar section sells relatively simple electronic and/or mechanical devices that haven't changed all that much in the past ten years. Most guitar accessories are sound enhancement devices like better pickups, active tone circuitry, and advanced vibrato arms rather than sound sources. Contrast that to the keyboard/synthesizer section, where microprocessor-controlled synthesizers, sequencers, and audio signal processors are all hooked together, communicating via MIDI (Musical Instrument Digital Interface) regardless of manufacturer or price.

One plausible explanation for the relative conservatism in the guitar market is that, until recently, there wasn't a reasonable (that is, really affordable) way to bring the largely acoustic-mechanical world of the guitar to the digital-microprocessor world of the MIDI synthesizer. With the introduction of the Roland GR-700 series in 1984, the guitarist can hook himself into this rapidly expanding set of sonic possibilities and not be stranded in the 1960s technology that typifies most guitar playing as we know it.

The MIDI guitar synthesizer is most certainly the next step in the evolution of the electric guitar—another level of "amplification" that allows easier and more effective articulation of new musical ideas. While many guitar purists may dispute this, it is the combination of new electronic technologies with the guitar that will lead to a new way of looking at and, as a result, playing the guitar. After all, the use of amplifiers, some effects, and a great amount of sustain led to the rich vocabulary of sounds perfected years later by players like Eddie Van Halen and Allan Holdsworth among others.

The guitar synthesizer holds a potential that is geometrically greater than the use of effects. The degree of control that keyboard synthesists have over the production, modification, and manipulation of sound can now be utilized by the guitar player, and without having to learn to play a keyboard. The facility to mimic other instruments is always fun and handy, but the raw materials and challenge of creating new sounds are perhaps the greatest benefits of audio synthesis now available to guitar players.

The ability to create a sound from scratch, add the desired harmonic and attack characteristics, and modify sonic content over time—while commonplace for the electronic keyboardist—is a very new tool to the guitar player, who usually works with a

limited subset of the timbral possibilities compared with those available to the synthesist. As a simple example, if a guitarist wants to create a big sound, regardless of the material, he or she may resort to that famous heavy metal sound since little else is available. With a guitar synthesizer, other "orchestral" textures that may be better suited to the musical task at hand can be used. If you want to get more elaborate and have access to multitrack recording facilities, the GR-700 class of guitar synthesizer will enable you to multiply the skills you have and produce overdubbed tracks that sound a lot lusher than the common two-guitar-bass-drum-machine mix.

All this newfound freedom and power comes with a little bit of responsibility though. A certain amount of work is required to reorient oneself, kind of like when you go from playing only an acoustic instrument to an electric one or vice versa. You take with you a great deal of what you've learned intact, but a little care is needed to make the transition. Let's first take a look in this article at the technical aspects of setting up a GR-700 guitar synthesizer.

In the beginning, be prepared to change strings, adjust a few dials, and learn to approach those familiar six strings with a fresh perspective. For the initial setup you should have the following readily accessible:

- a new set of strings in the gauge you prefer (for setup)
- a tuner like a BOSS TU-12 or TU-12H
- a small Phillips-head screwdriver (for hex pickup adjustment)
- a small plastic screwdriver used for TV/radio adjustment (usually available from Radio Shack or other electronic supply houses)
- a couple hours of free time the first time around to do the synthesizer controller setup (in addition to the basic guitar setup time).

Playing Action. As a necessary preliminary step, you should see to it that the guitar controller action is set up the way you prefer. If you don't know how to do this, take the guitar to a qualified repair shop or learn how to do it for yourself. It isn't that hard and you'll be glad you learned. Then, if you haven't done so already, read through the manuals that come with the GR-700 system and controller to familiarize yourself with the terms we'll be using.

You should have a properly playing controller in front of you after the standard guitar setup. Make sure you're happy with the strings, since you will be adjusting the controller based on the playing action of the guitar. If you can, avoid flat-wound, round-wound, or compound-wound strings, and gauges starting at less than .009. Certain picking techniques may require a lighter low-E string (from .38 to .42), especially if your right-hand technique is rather light. If you consistently play hard, however, the low-E string should be slightly heavier in gauge (.42 to .46), but no heavier than .46 should be used.

Guitar Controller Intonation. The key to a properly performing system is that the guitar must be in tune, in the sense that it is tuned to a frequency reference (like A-440) and it must be intonated, that is all the string compensation saddles properly adjusted so that the guitar plays in tune all over the neck. Do not use a tuning fork; no human ear is accurate enough for the process of guitar controller intonation. Use an electronic tuner that is accurate to the hundredth of a semi-tone, or cent.

Simply adjust the string saddles so that a string fretted at the twelfth fret and the sounding of the harmonic at the twelfth fret produce exactly the same pitch on every string. This is a pretty precise adjustment, so take the time to do it right, with as few

cents difference as possible. Usually you will have to do this only if you change string gauges or brands, but variations in strings from set to set may require a bit of tweaking.

Don't tune strings slightly sharp or flat to compensate for a tempered scale. As a rule of thumb, the closer you are to being perfectly in tune, the better the GR-700 system will perform. After you're sure all the strings have been intonated properly, tune the guitar to the reference tone as precisely as you can. There are several good books and even videotapes on the subject of setup and intonation, so if you need to, do a little research at your music store to get started. It's worth cultivating these skills

Guitar Controllers for the GR-700

The following guitar manufacturers are implementing Roland's unique guitar synthesizer interface under special license in select instruments:

Steinberger Sound (Newburgh and Staten Island, NY) offers the Steinberger GL-2/GR and GL-2T/GR guitar controllers, incorporating onboard electronic circuitry designed and built by Roland, for interface to the Roland GR-700 Guitar Synthesizer. The design of the Steinberger guitar remains virtually unchanged, and Roland's high-quality electronic components ensure accurate treatment of signals from the hexaphonic pickup. With the addition of this pickup to Steinberger's standard EMGs, each string on the guitar actually has its own pickup, through which string vibration is read and processed by the GR-700 module. Like other Steinberger products, these guitars are single, ultra-rigid structural units composed of a proprietary blend of reinforced composite materials with sonic properties considered by many musicians to be superior to those of wooden instruments. The Steinberger Blend™ aids the rapid, accurate tracking of the GR systems, and together with Steinberger's patented Double Ball String System™ (a modified bridge for easy top-load string changes and fast intonation and action adjustments), legrest, and optional Transposing Tremolo System (a patent-pending pitch-bending mechanism that permits individually controllable rate change so all strings maintain pitch rela-

tionships throughout tremolo travel)—many exciting new options become available to serious, forward-looking musicians.

Gibson Guitar (Nashville, TN) produces the Les Paul and Explorer guitar controllers, each offering the same Gibson feel, playability, and sound options found in their non-synthesized counterparts. In each model the Roland interface has been carefully integrated so the appearance of the instrument has had no appreciable alteration, and the feel of the instrument remains the same. The Les Paul controller features the classic combination of a carved hardwood body with distinctive multiple binding around the top, a one-piece quartersawn Northern rock maple neck, and select bound ebony fingerboard with dot inlays. There's also a gold-plated pickup and the Gibson ABR-1 Tune-O-Matic™ bridge and Stop Bar tailpiece. The Gibson Explorer guitar controller features a solid American hardwood body in the classic Explorer shape; its neck is one-piece quartersawn Northern rock maple with a select ebony fingerboard. There's also a chrome-plated pickup and Gibson ABR-1 Tune-O-Matic™ bridge and Stop Bar tailpiece. Each model has two Gibson pickups (patent pending) along with the Roland hexaphonic pickup, plus master volume and tone controls, pickup selector, and onboard controls for the GR-700.

M.V. Pedulla Guitars (Rockland, MA) manufactures the XJ-S, a guitar controller with stock electronics plus Roland's Hex pickup and circuitry to drive the GR-700 as well as other Roland guitar synthesizers. The maple neck extending throughout the

length of the body lends strength and stability, resulting in exceptional tracking capabilities. The ebony fingerboard is inlaid with mother-of-pearl, and the double cutaway design allows easy access to all twenty-two frets. Top-of-the-line Schaller hardware, a polished brass nut, and a Kahler locking tremolo system complete the instrument's solid feel and action. Aside from the synthesizer circuitry, the electronics of the XJ-S features two single coil/one humbucker combination or two humbuckers, all by Bartolini. The body of the XJ-S is protected with a super high-gloss polyester finish.

Hamer Guitars (Arlington Heights, IL) is deeply committed to guitar synthesis and knows that, contrary to popular belief, building a great guitar synthesizer controller is not as easy as simply installing the Roland electronics. The difference between a good controller and a great one lies in the ability of the instrument itself to produce a strong fundamental note. Still the logical choice for the discerning guitar synthesist (and the most popular controller from Hamer) is the Phantom A7, originally co-designed by Andy Summers of the Police as the A5. It features both single-coil and humbucking sounds in a multiple of combinations, plus a locking tremolo system by Kahler, and that re-known Hamer playability. Hamer has also installed the GR System in several other models, notably the VKK for K.K. Downing of Judas Priest and the SS for Steve Stevens of Billy Idol.

anyway, to maintain those more conventional guitars that you may own.

Hex Pickup Adjustment. Now use the Phillips-head screwdriver to adjust the hex pickup (the narrow one next to the bridge). Try to get it .05mm from the high-E string and .08mm from the bass-E string. These values are not absolute and depend on your playing style and guitar setup preferences. Get it so that it is as close as possible yet allows the string to vibrate freely without buzzing out. That's the end of the physical guitar controller setup.

Individual String Sensitivity Adjustment. Once the hex pickup is situated correctly, there are individual string adjustments that can be done. Remove the electronics backplate (refer to the guitar controller manual) to expose the innards of the guitar controller. You'll see six trim pots which function as individual string sensitivity controls. Refer to your GR-700 owner's manual, page 33, to find out which trim pot corresponds to which string. These trimmers set the level of string attack needed to trigger the GR-700 synthesizer section. Adjust these with the plastic screwdriver. Under no circumstances must they be forced past the minimum/maximum detents. Set the synthesizer module to Edit parameter number 48, then set the Sensitivity Toggle Switch to position 3, Touch Sensitivity II and lightly play on each string with a finger or pick. (Use your finger if you do any finger picking techniques.) If no sound is produced, incrementally increase the trim-pot setting until sound is produced from light playing. Do this for all strings and it will get you a wide dynamic range. Set at too low a sensitivity and it's hard to get all the dynamic response out of the controller. Set at too high a sensitivity, you'll notice that just about any minor brush against the string will cause the GR-700 to output something of unpredictable note value.

Sensitivity Toggle Switch. The last controller adjustment is made when you play the GR-700; the mini-toggle switch near the controls determines overall sensitivity. The Position 1 (Guitar Only) setting disables the synth sounds and the function of the Synth/Guitar balance control. Position 2 (Touch Sensitivity I), in the middle, is for playing with a heavier touch. Position 3 (Touch Sensitivity II) is useful for playing with a light touch. You can play around with this switch depending on how you are playing at the moment. This toggle switch interacts with the individual string controls, so you may have to adjust them together if your picking technique is extraordinarily light, heavy, or varied. With certain musical situations and sound patches it may be necessary to switch between the Touch Sensitivity I and Touch Sensitivity II positions.

Reference Frequency. After the guitar controller is fully adjusted, the GR-700 synthesizer module itself must be tuned to the desired reference frequency. In the United States it's A-440; in Europe and Japan it's A-442. Whatever it is, make sure your guitar controller is in tune with the reference as closely as possible. (A digital tuner like the BOSS TU-12 can really be handy here too, and is almost indispensable for the synthesizer user.) The internal tuning of the GR-700 is done for two internal

values, the chromatic and non-chromatic modes, both of which must be consistent in order to achieve pitch and tracking stability. (Note: The PG-200 programmer receives its power from the GR-700 module and should never be plugged into or unplugged from the GR-700 while it is turned on, as this can damage the PG-200.)

Tuning the Chromatic Mode. Set the guitar controller balance control fully clockwise so that only the synthesizer's sound comes through the controller's output. Attach the tuning device or a suitable amplifier to the Mono Output jack of the GR-700. Press the Edit pad on the GR-700 panel and call up parameter number 48. Next check to make sure that the Chromatic LED light is on. Press the Chromatic switch if it is off. Play the high-E string and watch the tuner or listen to the pitch coming through the amplifier. If the reading or sound fluctuates, make sure the balance control is fully clockwise.

The sound usually should be slightly sharp or flat compared to the reference frequency. Center the tuner's meter to A-440 (or whatever reference frequency) by adjusting the Edit control on the guitar controller until the tuner confirms A equals 440, then proceed to the next step.

Tuning the Non-chromatic Mode. After the Chromatic mode is tuned, press the Chromatic switch so that the LED Chromatic light is off. Play the high-E again, but this time tune the GR-700 by turning the Tune knob on the back of the synthesizer module until A equals 440 (or desired frequency) as shown by the electronic tuner.

Setting the Tuning. Repeat the tuning procedures for both modes until there is no discrepancy between the Chromatic and Non-chromatic settings. Make sure that the optional PG-200 Programmer is not attached to the unit. When the two modes are verified as consistent, write the tuning settings into the GR-700's memory as follows: Turn the Memory Protect switch on the back of the GR-700 off, and then press Write and the number 1 footswitches. After that, turn the Memory Protect switch back on if you don't plan on writing to memory anymore, just to be safe.

The above procedures will rarely have to be repeated in their entirety unless you decide to change your playing action or string gauge. If you ship your GR-700 or lay it aside for a while, it's wise to check its internal tuning. It also couldn't hurt to readjust or at least check the intonation of the guitar controller when you replace the strings. It's best to tune the chromatic and non-chromatic modes before every live set or recording take to ensure stable tuning tracking. The better adjusted the system, the better it will perform.

In the second part of this article, appearing in the next issue, we'll be taking a look at GR/MIDI applications as well as exploring some special playing techniques and "tricks" you can use to really get the most from your GR System. 

INTERPRETING SIGNAL PROCESSOR SPECIFICATION SHEETS

by Ralph Jones

Virtually every manufacturer of pro audio equipment publishes specifications of its products. Specifications are meant to be concise summaries of the major operating characteristics of the gear in question. For the person who buys (or is contemplating buying) that gear, specs should perform two important functions: They should make it possible to compare pieces of equipment without having to test them personally; and they should serve as a quick-reference guide when the equipment is actually connected and used.

Unfortunately, there are no hard standards governing the writing of specifications—only some common practices. Consequently, each manufacturer decides what to say about its equipment and how to say it. This situation makes it more difficult for end users to make informed decisions about what equipment to buy and about how to use it when they've bought it. But don't give up—there's hope.

The way around the lack of standards is to learn the language of specs. After all, we all know that there are lots of ways to express a thought in English. But if you know the language and use your head, you can understand what different people are saying. The same thing is true of technical specifications.

Units of Measurement

The performance characteristics of a piece of audio equipment are determined by measuring the equipment in a lab. The result of any audio test is a measured quantity, expressed in units that are the electronic equivalents of inches, feet, pounds and so on. These units are used to write specifications.

Happily for us, electrical units are subject to pretty strict standards. For that reason, they are used fairly consistently and can be converted and compared, all that's needed is a calculator and a little knowledge. The ability to recognize commonly used electrical units—and to interpret them—is a fundamental key to understanding specification sheets.

The sidebar to this article gives defini-

tions of the units that we'll be talking about, as well as some of the terms we'll be using. When you hit a word or unit you don't recognize or understand, check that list.

Getting Prepared

The single most important thing that you need to know when you're reading and comparing specifications is what you want out of the equipment. Analyze your application thoroughly. What functions do you want the equipment to perform? Examine the other equipment that you're going to use it with. How are you going to connect the equipment? What does each device require of others that it's connected to? Think about trade-offs. What performance characteristics are essential? What are you willing to compromise on?

Then get familiar with what's available. Try out different equipment whenever possible—at your dealer or in a friend's home. When you try out a piece of equipment, take home the spec sheet if you can, so you can study it. In the business of audio, numbers are not enough, you have to be able to relate those numbers to actual experiences. Only then will they really make sense. The more you study and listen, the greater your understanding will be.

In this article, we're going to talk about interpreting signal processor specification sheets, explaining what the numbers can mean in terms of the real world of music-making. The process that we go through can serve as a model for interpreting other types of specifications.

In its simplest form, an audio signal processor can be modeled as a box with

one input and one output. Audio signals are passed through the box from input to output and in the process are modified in some way. The specifications for the box should tell you all about that situation. It should tell you what kinds of signals the box is designed to handle, what conditions it expects of the source that feeds it, what it does to the signals it processes, and what conditions it expects of the device that it sends its output to. You need to know all of this, after all, if you're going to use the thing.

A Typical Specification Sheet

Let's take a look at a typical signal processor spec sheet and get answers to all those questions we just defined. Say you're shopping for a digital delay. You want to be able to use it with your guitar and its amplifier, but you also may want to use it on a synthesizer and occasionally as an effect when mixing demo recordings. You're considering the Boss DE-200 Digital Delay.

First, analyze your applications. Since you want to use the delay with instruments, you'll want it to be capable of phasing, flanging, and chorus effects—all these are incredibly powerful with instruments. For recording, you may want to simulate reverb. These effects require short delay times, in the range of 2mS to about 50mS. You may also want to use slap-echo, or long multiple-repeat echoes, for special effects. If so, you'll want longer delay times, too—in the range of 100mS to a second or more.

Because you want to use the delay with a guitar and amplifier, you'll want to look for a device that you can plug the guitar

BOSS DE-200 Digital Delay Specifications

Delay time	Mode 1	1.25mS to 640mS
	Mode 2	2.5mS to 1,280mS
Frequency response	Direct	10Hz to 100kHz + 0.5/-3dB
	Mode 1	10Hz to 10kHz + 0.5/-3dB
	Mode 2	10Hz to 4.5kHz + 0.5/-3dB
Dynamic range	Direct	110dB
	Delay	80dB
THD	Direct	0.08%
	Delay	0.25%
Input level/impedance		-20dBm/1M Ω (mega-ohm)
Maximum input level		+12dBm
Output level/impedance		-12dBm/over 10k Ω (kilohm)

Fig. 1

Glossary of Terms

audio frequency—A frequency within the audible range. The audible range is commonly accepted to extend from 20Hz at the low end, to 20kHz at the upper limit.

current—The flow of electrons in a circuit path from a point of lower (more negative) potential (voltage) to a point of higher (more positive) potential.

dB—Abbreviation for decibel, a logarithmic unit of measurement for ratios. (See "The Decibel")

delay—A device that delays input signals for a certain period of time, releasing them at its output after the delay period has elapsed. In theory, the length of the delay time for a given setting is the same at all frequencies.

distortion—Any unwanted change in an audio signal, causing frequencies at the output of a signal processing device that were not present at the input. Most often perceived as an increase in harshness; gross distortion causes an audio signal to approach the sound of noise. There are many different types of distortion in audio systems: harmonic distortion, IM (intermodulation) distortion, TIM (transient intermodulation) distortion, SID (slew-induced distortion), and so on. (See THD)

frequency—The rate of vibration of current or voltage in an electrical audio signal, or of air pressure in an acoustical sound. Measured in Hz (Hertz). Frequency corresponds to the musical attribute of pitch: the higher the frequency, the higher the pitch. The term is also used to refer to signals at specific frequencies, as in, "There are additional unwanted frequencies at the output."

gain—The ratio of the output level to the input level of a signal processor, usually expressed in dB. If the gain is a positive number (output level is greater than input level), the signal processor is amplifying the signal. If it is a negative number, the processor is attenuating

(reducing the level of) the signal. A signal processor with a gain of 0dB does not change the signal level. (This is also called gain of unity.)

Hz—Abbreviation for Hertz, the unit of measurement for frequency. 1Hz = 1 cycle per second.

impedance—(AC circuits) The total opposition to flow of alternating current in a circuit path. Measured in ohms.

input impedance—The impedance seen at the input to a device by the source driving that input. The lower the input impedance, the greater the current required from the source to drive the input.

k—Abbreviation for 1,000. 1k ohms = 1,000 ohms; 10k ohms = 10,000 ohms. Read as "kilo;" 1kHz = "one kilohertz" and 1k ohm = "one kilohm."

level—The amplitude, or strength, of a signal. Usually expressed in dB, related to a reference level.

line level—The nominal (average) operating level of an audio system, usually corresponding to a 0 VU meter reading. Measured in RMS volts, or more commonly in dBm or dBv. There are several standard line levels; the two most common in audio are +4 dBm = 1.23 volts RMS, used in professional equipment, and -10 dBv = 0.310 volts RMS, common in semi-professional equipment.

M—Abbreviation for 1,000,000. 1M ohm = 1,000,000 ohms. Read as "meg" or "mega;" 1M ohm = "one megohm" and 1MHz = "one megahertz."

mS—Abbreviation for millisecond. A millisecond is one thousandth of a second: 1,000mS = 1 second.

noise—The unwanted component in the output of a signal processor that is spontaneously generated in the processor itself, rather than being caused by a distortion of the input signal. Usually random in nature, and heard as a hiss. "Noise" is sometimes also used to refer to the total unwanted output component—spontaneously generated or induced—which may include hum, radio interference, rumble, and so on, as well as hiss.

nominal operating level—The average signal level at which a signal processor or audio system operates, expressed usually in dBm or in dBv. Also called "reference level."

ohm—The unit of measurement used to quantify the opposition to current flow in a circuit path (resistance only in DC circuits; both resistance and impedance in AC circuits).

overload—A condition exceeding the design limits of a device, which results in distortion. May occur when an output is asked to drive too low a load impedance, or when an input is asked to accept too high a signal voltage.

signal—An audio signal is an electrical representation of a sound, in the form of a fluctuating voltage or current suitable for electrical processing or recording. Sound vibrations are transformed into audio signals by microphones. Audio signals are transformed back into sound by loudspeakers or headphones.

THD—Total Harmonic Distortion. The sum of all harmonic distortion components in a signal. (See distortion)

voltage—EMF (Electro-Motive Force), or electrical potential, which causes the flow of current through a circuit path. Measured in volts.

into directly. For this reason, you'll be looking for a device with a high input impedance (so it doesn't load the guitar pickup down) and a low nominal operating level—say, -15 to -20 dBm. But you also want to be able to use it with synths and recording equipment, so the delay has to be able to handle higher operating levels—up to, say, a maximum of $+4$ dBm. Finally, it has to sound right to you. Only you can decide what that means, and the key to finding that out is experimentation.

Knowing what you want from a digital delay, you're now in a good position to read and interpret some specs. Figure 1 is a

listing of the specs for the Boss DE-200. To find out if this delay is going to suit your purposes, break it down and analyze it piece by piece.

Delay Time. This spec tells you the range of time delays that the unit is capable of. Looking at the DE-200 specs, we see that it operates in two modes, called Mode 1 and Mode 2. When we examine the delay times for each mode, we can see that the times for Mode 2 are twice those for Mode 1. The total delay range of the unit, then, is from 1.25 mS (short enough for phasing and flanging effects) to

1280 mS (about 1.3 seconds—a healthy echo). So far, so good.

Frequency Response. This spec gives the range of frequencies that the unit will pass from input to output. Look at how the Direct Mode (no delay) spec is written: 10 Hz to 100 kHz $+0$, -3 dB. The decibel figures ($+0$, -3) are the tolerance of the spec. From the tolerance, we know that at the upper and lower limits of the frequency response, the output will be 3 dB lower in level than the input. We also know that the total response will hold within a 3 dB window across the audio band—there

The Decibel

The decibel is a logarithmic unit of measurement that expresses the ratio between two quantities. It appears in several forms in audio equipment specifications, and one key to understanding and comparing specifications lies in being able to interpret this unit in all the forms that it takes.

In signal processor specs, the decibel (unreferenced) is normally used to refer to voltage ratios (signal-to-noise, frequency response tolerance figures). The equation that is used to arrive at a decibel figure in this case is:

$$\text{ndB} = 20 \log V1/V2 \text{ (in volts)}$$
where $V1$ and $V2$ are the voltages being compared.

If $V1$ is twice $V2$ (ratio of 2), then the decibel figure is 6 dB. If $V1 = V2$ (ratio of 1), then the decibel figure is 0 dB. If $V2$ is twice $V1$ (ratio of $1/2$), then the decibel figure is -6 dB.

Dynamic range is one example of a specification that is expressed in dB. Dynamic range is the ratio between the maximum output level of a device and the noise floor of the device. So, to calculate dynamic range:

$V1$ = maximum output level
in volts RMS

$V2$ = noise level in volts RMS

Substituting the measured values for each, you solve the equation and arrive at a decibel figure. This calculation, like all those relating to decibels, can be done on any hand-held scientific calculator. To convert a decibel value back to the decimal equivalent of the ratio, the equation is:

$$(V1/V2) = 10^{(\text{ndB}/20)}$$

To solve this equation using a calculator, take the decibel figure (ndB), divide by 20, then use the 10^x key to raise ten to that power. The result is the decimal equivalent of the voltage ratio that is expressed by the decibel figure. (The decimal equivalent of a voltage ratio of $1/2$, for example, is 0.5.)

But the decibel also appears as a unit for specifying a single level value. For example, we might see a signal processor with a specified nominal operating level of $+4$ dBm, or of -10 dBv. What do these figures mean? Nominal operating level isn't a ratio, it's an absolute voltage value: $+4$ dBm, we're told, is equal to 1.23 volts RMS. -10 dBv is equal to 0.310 volts RMS. Where do these figures come from?

The letter suffix (the "m" in dBm, and the "v" in dBv) identifies each of these units as decibels referred to a standard reference. The reference takes the place of $V2$ in the equations above, and $V1$ is the voltage value that is being expressed in a decibel form. A negative value means that the voltage being expressed is less than the reference; a positive value means that it is greater than the reference; and a value of 0 means that it is the same as the reference.

The units you will see most commonly are:

dBm—dB referred to 1 milliwatt
(normally through 600 ohms)
dBu—dB "unterminated," referred
to .775 volts RMS
dBv—dB volts RMS, referred
to .775 volts RMS

Of the three, only dBm is a power reference: dBu and dBv are voltage references. Interestingly, 1 milliwatt through 600 ohms, which is 0 dBm, is equal to .775 volts RMS. So, from a voltage point of view, the three units are the same at the reference level.

The fine distinctions among these units are beyond the scope of this article, and are very often ignored in specification sheets. In fact, the unit dBm is used incorrectly most of the time, at least from a strict engineering standpoint. Engineers have been seen to foam at the mouth about this. Our purpose, however, is to be able to interpret the specifications, so that we can compare products. We have to deal with the way these terms are being used, whether the usage is "correct" or not. The fact of the matter is they are used, for the most part, as though they were the same. And there's nothing that you can do to change that. So, when you look at specification sheets, remember that from a voltage point of view:

$$0\text{dBm} = 0\text{dBu} = 0\text{dBv} = 0\text{dB}$$
referred to .775 volts RMS

If you are contemplating a career as an audio engineer, or are already pursuing one, study the real differences among the various decibel units. Then, you'll be able to use the units correctly, whether or not others do. A good place to start your study is the *IEEE Standard Dictionary of Electrical and Electronic Terms*, published by the Institute of Electrical and Electronics Engineers, Inc., New York, New York (1977).

are no peaks (+0) that would tend to color the sound. Without a stated tolerance, a frequency response spec is useless, that is, if the spec only states the frequency limits. We are left to guess whether the response is flat within that band.

Two other frequency response specs are given, one for Mode 1 and one for Mode 2. We know that these are the delay modes and that Mode 2 gives longer delays than Mode 1. Notice that all three specs are different, the lower limit stays the same, but in Mode 1 the upper limit is 10kHz and in Mode 2 it is 4.5kHz. From this spec, then, we know that as the delay times get longer, the output signal will lose a bit in the highs. This will change the sound quality.

Such behavior is characteristic of most delay processors and is a function of their design. But what does this mean in musical terms? In Mode 1, the DE-200 is flat to 10kHz. This is only an octave below the upper limit of human hearing (20kHz), and so should be fine for phasing, flanging, and chorus. But what about the Mode 2 spec? 4.5kHz is pretty low, isn't it?

We know from the delay time spec that Mode 2 gives the longest delay times—up to 1.3 seconds. Here we're definitely into echo. How will the loss of highs affect the sound? Well, think about what it sounds like when you clap your hands in a big hall. By the time the echo comes back to you, the sound has traveled a long way. All along the way, high-frequency energy is being absorbed in the air. When the echo reaches you, it's lost highs and sounds more boomy. So the loss of highs at longer delay times in the DE-200 should sound more natural. But if you haven't worked with a digital delay before, or if you're after something special that uses long delays, you'll want to try the unit in Mode 2, listening, and then making a judgment.

Dynamic Range. This is the difference between the unit's noise floor and its maximum operating level. From this spec, you can judge how much noise the DE-200 might add to your system. The larger the number, the lower the noise will be.

In Direct Mode (no delay), the DE-200's dynamic range is given as 100dB. With delay, the figure is 80dB. (This also is characteristic: Digital delays tend to add a bit of noise in delay mode.)

To put these figures in perspective, consider that a good reel-to-reel tape recorder will have a dynamic range (noise floor to 3 percent distortion level) of about 70dB. Passing a signal through the DE-200, then, will add considerably less noise (10dB less, to be exact) than recording the signal on a good reel-to-reel and playing it back.

THD. THD stands for Total Harmonic Distortion. This figure is always expressed in percent, and it tells us what proportion of the output signal will be distortion products that are generated by the device itself. Opinions differ on how much distortion is audible, but it's generally agreed that, except in very critical hi-fi and studio listening, distortion of less than 1 percent is hard to detect. Regardless, the lower the number the better.

In direct mode, the DE-200 generates .08 percent THD; in delay mode, the figure is .25 percent. Note that both figures are well under 1 percent. Particularly for instrument use, this is more than acceptable. But what about recording? Again, let's use the example of a tape recorder. A good reel-to-reel will generate about .5 percent THD at its nominal operating level and a few percent at its maximum level. So using the DE-200 will result in about half as much distortion as a good tape machine would introduce.

Input Level/Impedance. This spec tells us what effect the unit will have on the source that feeds it and what signal level it wants to see from that source. As professional equipment is designed nowadays, an input impedance of 10k ohms is standard for line-level gear. Guitar amplifiers need to have a higher input impedance—generally, close to 1M ohm—so that they don't load the pickups down. An input impedance that's higher than 10k ohms is fine for line-level equipment, it just means that the signal source needs to work less hard. But if you try to drive a 10k ohm impedance from a guitar pickup, you'll find that the sound quality degrades severely.

Guitar pickups work at a signal level that's lower than line level—usually, -20dBm or so. Line levels (synths, tape machines, mixers) may vary from -10dBv to +4dBm, depending on your equipment. Given our applications, we want a high input impedance and a wide tolerance of input levels.

From the spec, we can see that the DE-200 input impedance is 1M ohm, which is fine for guitars and great for line-level gear. The unit's nominal operating input level is -20dBm. Together with the input impedance spec, this tells us that the DE-200 is designed to be fed by a guitar pickup without problems. But what about if we want to use it with a synthesizer or mixer? Will it tolerate the higher levels that these components use?

Maximum Input Level. This figure provides the answer to our question. The DE-200 will tolerate input levels up to +12dBm, which is above the nominal operating levels of most synthesizers and demo recorders/mixers. From this number, then, we can conclude that we can use the DE-200 with line level equipment without fear of overload.

Output Level/Impedance. These figures tell us about what the unit likes to be connected to. We've mentioned that a guitar won't sound right if it's asked to drive too low an impedance. The same is true of signal processors. Connect them to an impedance that's lower than they're designed to handle and the sound will degrade. From the spec, we can see that the DE-200 output is designed to drive inputs rated at 10k ohms or higher. This means that it will work well at line level (10k ohms) and be very happy with an instrument amplifier (usually around 1M ohm).

The DE-200 nominal output level is the same as its input level. From this, we can deduce that the unit's gain is unity (0dB)—it does not amplify the signal. And given that it will take up to +12dBm at the input before distorting, we know that it will work at line level too.

At this point, we've answered all the questions that we posed at the beginning. Similar techniques can be used to analyze other signal processor spec sheets. But the numbers can never tell the whole story. The final test of any signal processor is when you actually plug it in and hear how it sounds. Remember, the ear is a very sensitive test instrument. Specifications can be used to determine whether a particular unit may work for your application, and they will help to eliminate obviously unsuitable candidates. Beyond that point, listen and feel. Your ear will tell you what the right choice is. 

DDR-30 Digital Drums

The new DDR-30 Digital Drum Unit is the first MIDI-compatible digital drum system from Roland, consisting of a rack-mountable module and two kinds of drum pads—the PD-10 Bass Drum Pad and the PD-20 Snare/Tom Pad, capable of sensing every nuance of a drummer's technique. Its realistic PCM digital drum sounds with ultraflexible modification options (over thirteen parameters for such things as amplitude, attack, envelope decay, pitch bend depth and decay, dynamic sensitivity) along with MIDI compatibility (In, Out, Thru) distinguish it from other digital drum units on the market. Six drum voices (bass, snare, and four toms) come with the DDR-30 and you can modify and store your own sounds in memory—up to eight different selections per voice! In addition, the unit will memorize up to thirty-two combinations of drum sounds, expandable up to ninety-six with an optional memory cartridge. All programmed data and memory functions are displayed on the front panel to enable the easy and accurate modification of sounds. There are pad trigger input jacks (for using with other brands of drum pads) and mix as well as individual output jacks for each drum sound.



PAD-8 Octapad

The PAD-8 Octapad is a dynamically sensitive, MIDI-compatible eight-pad controller with memory. Any MIDI sound sources—from synthesizers to drum machines—can be assigned to any of the eight pads. Parameters such as MIDI channel and velocity/gate time are adjustable for each pad, and up to four patches can be memorized with the Patch Preset function. Program change information can also be sent from the PAD-8. In addition to the eight pads, six inputs are provided for expansion to using other external pad controllers.



MKS-7 Super Quartet

The MKS-7 Super Quartet with MIDI offers four dynamically responsive sound sections: Melody (two voices, with 100 presets), Chord (four voices, with 100 presets), Bass (one voice, with twenty presets), and Rhythm (eleven PCM recorded drum sounds). Melody, Chord, and Bass are modifiable via MIDI (In and Thru) for editing, channel assign, program change, and saving and loading. In addition to keyboard information, Melody and Chord can receive bender, modulation, and hold information. Controls include a master volume control and sliders for individual sounds, key transpose, tuning, with easy-to-read indicators and display. There are stereo headphone output jacks, as well as mix and individual outputs for each sound section. The MKS-7 comes with an ivory finish, or rackmountable in black.



OD-2 Turbo Overdrive

The OD-2 Turbo Overdrive (like its predecessors the BOSS OD-1 and SD-1) produces the sound of an overdriven tube amplifier, but with the added power of being able to drive the sound as hard as possible while still retaining every nuance of the natural guitar tone. Containing newly developed discrete circuitry, the highest signal-to-noise ratio is ensured. Controls include Level, Tone, Drive, and Turbo On/Off.



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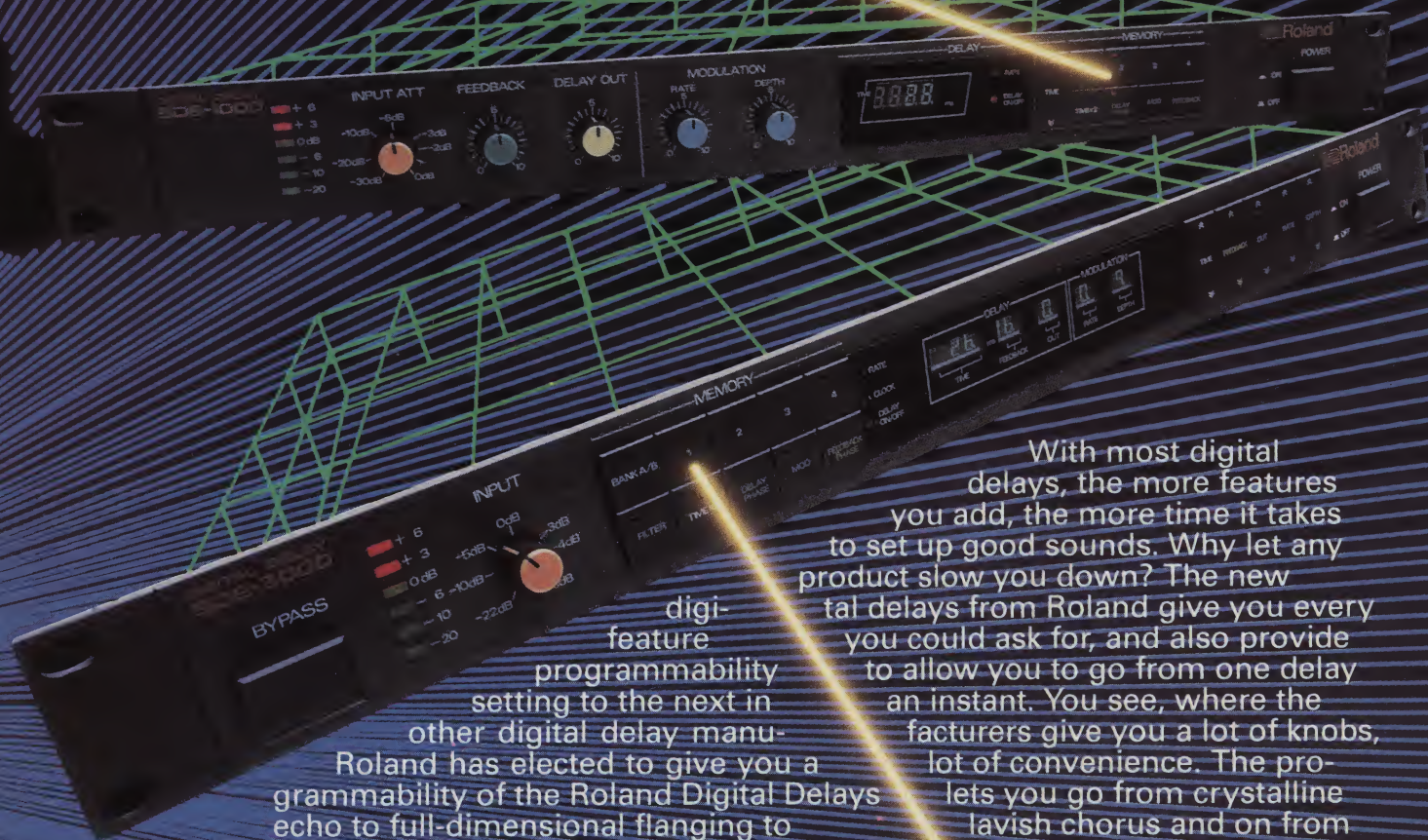
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